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PURPURA HÆMORRHAGICA, WITH PROTRUSION OF EYEBALLS, IN A HORSE.

BY F. WALKER, M.R.C.V.S., FIRST LIFE GUARDS.

TROOP-HORSE D. 22, aged nine years, was admitted to hospital on the afternoon of May 29th, with swellings of different sizes on various parts of the body. The most prominent of these was one extending from the sternum as far as the sheath of the penis. These enlargements were of an indurated nature. The horse had been at work in the morning, and appeared to be in his usual health. At three o'clock, when being led out to the water-trough, it was noticed that he did not move freely, and the man at once brought him to hospital.

The enlargements were well fomented, and Oleum Tereb. *c.* Oleum Lini. administered. At evening stable hour, 6 p.m., I observed that both hind legs were tumefied. These were swathed in woollen bandages, and a draught composed of Eth. Sulph. *c.* Ferri Iod. given. The appetite continued good, and I considered this case to be one of ordinary Anasarca.

At 6 a.m. on the morning of the 30th it was reported to me that the patient was much worse, and I found him with the head and neck enormously enlarged, especially the face and lips, which bore a strong resemblance to those of the hippopotamus. The enlargements about the body had also increased in size. Upon examination, I found the inside of the lips of a dark purple hue and the eyes bloodshot. Serum exuded from the skin covering the swellings, showing that I had now a case of Purpura Hæmorrhagica in its worst form to deal with. Stimulants and tonics were freely administered. The appetite was never wholly lost, but there was great difficulty in mastication, though oatmeal gruel was swallowed easily and with avidity.

About 9 a.m. on the third day after admission, the eye on the right side was observed to be slightly protruding. With constant fomentation this protrusion was somewhat reduced, but in the afternoon of the same day the left eye became congested, and in a very short space of time to an alarming extent. Local remedies, with scarification of the conjunctiva, were applied, but without benefit. As this case was unique and the only one of the kind I had ever seen, I had photographs of the animal taken, showing the state of body and protrusion of the eye on the left side. These I forwarded to Dr. Fleming, C.B., the Principal Veterinary Surgeon to the Forces.

I imagine that the congestion and protrusion of the eyeball were caused by embolism of the vessels supplying the eye with blood. On the 4th June, the animal being semi-comatose, and considering it a hopeless case, I had him destroyed.

Autopsy immediately after death. Abdominal cavity: organs healthy, with the exception of the liver, which was slightly hepatised.

Thoracic cavity: organs healthy.

The cellular tissue, wherever any enlargement existed, was distended with serum, mixed with blood.

I was unfortunate in endeavouring to extract the eyeball in its entirety, thus losing the chance of discovering the cause of the congestion and protrusion.

SOUTH AFRICAN HORSE SICKNESS.

BY J. A. NUNN, F.R.C.V.S., A.V.D., BARRACKPORE, INDIA.

In a report on this disease which was published in the Veterinary Journal of January, 1888, I pointed out that although Horse Sickness was at one time very prevalent in the Cape Colony, extending even as far south as Cape Agulhas, of late years it has entirely disappeared from these parts; and I endeavoured to show that, it being a malarial fever, the reason it is no longer observed in the south of the Colony is that the features of the country have altered. This alteration, I pointed out, was, in my opinion, due to the introduction of the merino sheep, which have eaten down the herbage under the karoo bush, thus changing the character of the "veldt," and covering the face of the country with a series of surface drains by the sheep walks they made. All these facts were reasons, "amongst many others," that I advanced to show that South African Horse Sickness was a very remarkable type of malarial fever, and not "Anthrax," as was commonly supposed. That the character of the South African "veldt" changes

under cultivation, I find has been noticed by others—amongst them Mr. F. C. Selous, the great South African hunter. In an article in the *Fortnightly Review* for May 1st, 1889, on "Mashunaland and the Mashunas," he says, "When the Boers first occupied the Marico district of the Transvaal, which in its general features is very like the slopes of Mashunaland, they suffered much from malarial fever; but as the land was gradually brought under cultivation the fever steadily decreased, and now the country is considered eminently healthy."

AN UNUSUAL CASE OF LAMENESS.

BY F. DUCK, A.V.D., ARMY REMOUNT DEPOT, WOOLWICH.

A WELL-BRED, powerful hunter, while being ridden with the drag, was jumped from a grass field over a hedge into a road lower than the field, and was then found to be dead lame with almost complete loss of power of the off hind leg. The horse was taken home quietly and slowly, and presented the following symptoms when I saw the case some two hours afterwards.

Symptoms.—Horse in pain, uneasy and anxious, sweating in patches. When excited to move, there was complete inability to flex and advance the off hind leg, the gastrocnemii tendons became relaxed, showing a deep "kink" about three inches above the hock.

An ambulance was obtained, and the patient, being assisted by a rope passed round the foot to draw the leg forward, was with a little difficulty removed to the sick lines and placed in slings.

Previous History of Patient.—It should be stated that the horse had previously been unlucky in that leg. There was flattening over the tuberosity of the ischium, chronic enlargement at the antero-inferior portion of hock, with considerable thickening of the fetlock and pastern.

Next morning the leg was found hanging loose and in a backward position; when the affected limb was raised the foot and pastern swung loosely from side to side, but when it was drawn a little in advance relief was given, and the horse rested his full weight on the limb. Any effort of his own accord to advance the leg only resulted in the slackening of the tendons and the appearance of the "kink" previously mentioned, with slight throwing outwards of the toe.

Beyond the chronic enlargements, there was no swelling or heat; but it was observed that, when the feet were evenly placed and the horse standing square, there was flattening of the inside of the

leg from the hock to the stifle, with a wrinkled appearance of the skin.

Diagnosis.—Mr. Digby Whitfield, A.V.D., kindly saw the case with me, and we formed the opinion, from the symptoms presented, that there was laceration, if not rupture, of the flexor metatarsi.

Treatment consisted in keeping the patient quiet in slings, and assisting nature's restorative powers. After some observation, it was found that the position giving most relief was when the foot was placed evenly on the ground, about two inches in advance of its fellow. Accordingly, by means of a side line, the leg was secured in that position. After a time this caused chafing of the heel; a patten shoe was then put on, and the line fastened round the foot.

On the 10th April, the horse, frightened by a troublesome patient in the next box, commenced plunging violently and slipped up. I was apprehensive that serious harm would result; however, it only appeared to act as a beneficial stimulus, as the subsequent recovery was more rapid. On the 10th May the patient was taken out of slings and turned loose in a large pound, and on the 9th of June was discharged. He is now being regularly exercised under saddle, and walks and trots level and true.

REPORT ON AN OUTBREAK OF "ANTHRAX" AT MHOW, CENTRAL INDIA, AMONG THE HORSES OF THE CARABINEERS.

BY J. A. MEREDITH, A.V.D., MHOW, CENTRAL INDIA.

General character of Mhow. Position.—Mhow is a military station of Central India, situated upon the edge of the Vindhya Ghats, about 1,900 feet above the sea level, latitude 22·33, longitude 75·46, and about 12 miles from Indore.

Aspect.—The general appearance of Mhow is somewhat similar to the Deccan country, but presents very characteristic conical or flat-shaped hills in almost every direction from the cantonment; so, although situated upon the top of the ghats, it is practically encircled by hills on every side. A number of main roads communicate with Mhow, but a great many are only suitable for pack-animals.

Railway.—The Rajputana-Malwa State Railway passes through the station, connecting Ajmere with Khandwa on the Great Indian Peninsula Railway. Neemuch is situated some 150 miles from Mhow.

Climate.—The climate of Mhow is one of extreme mildness, never exhibiting extremes of heat or cold, and the past hot

season, I am informed, was very similar to the ones of late years. The rains generally commence about the middle of June, but sometimes a slight rainfall is experienced in May; so the hot weather is of short duration. Mhow certainly can boast of always having a strong breeze in the hot weather; at the same time it is never very distressing, being dry and never accompanied with dust-storms.

Tatties work remarkably well during the hot season, and punkhas are hardly needed. The rains are spread over a number of weeks, and often last well into October, after which the cold weather is supposed to set in and continue until March. The station of Mhow is adjoining the Holkar State, and takes its name from a small village outside cantonments and upon the edge of the Gumbheer River, which becomes more or less dry during the non-rainy season; the station is an exceedingly widespread one and unconnected, being $3\frac{1}{2}$ miles long by $2\frac{1}{2}$ miles wide.

The surrounding country contains large stretches of black cotton soil, whilst the well-known mhorrum exists in other directions; it is one of the most dangerous and trappy districts to ride over that could be found, being full of holes which are, at this season of the year, more or less hidden and cannot be easily seen. The depth of the black cotton soils varies much, being from 2 feet to 7 feet deep; besides this danger from the holes in the cotton soils, there is another great difficulty to contend with, viz., the immense quantity of loose stones on all mhorrum grounds: thus between these two forms of soils, great danger is entailed in carrying out any cavalry manœuvres. Little vegetation exists upon the higher ridges, and the country presents a bare aspect. Where cotton soil exists, of course strong cultivation is always carried on.

Sanitary character.—Mhow is an extremely healthy and popular station for all the year round, except during the rains, when malarial fevers are prevalent; but this can be said of almost every station in India.

Epidemics have occurred of late years among the troops, and this last season Small-pox prevailed, whilst just at the present time the hospitals are full of mild cases of fever. During the season preceding the rains, Foot-and-Mouth disease was raging over all the district, including Mhow Bazar, a place where a great number of milking cattle are kept for the purpose of supplying milk to the cantonment; the disease also appeared in 4-1st (Heavy), Welsh Division, Royal Artillery,—27 cases in all; but with strict segregation and constant inspection of the bazar cattle, I was able to prevent it increasing as rapidly as it would have done had I not kept all cases up and been assisted with police supervision. During my rounds in the gowlie's (milkmen's)

settlements, I saw subjects of Small-pox in all its stages freely intermixing and working with the people who daily brought milk into cantonments for sale. One cannot help but confess that the disease must spread in this manner.

After this had passed away a sudden and more fatal change arose among the cattle; they became ill in almost every village, dying rapidly after showing only a few days' illness; and from careful personal inspection, and all information I can gather upon the subject, I have come to the conclusion that Anthrax was the cause of so many deaths. I need not mention that no sanitary measures were adopted to dispose of the dead animals in the villages, but they were allowed to decay and be devoured by wild animals, and I cannot ascribe this outbreak among the cattle to any particular cause. The prevailing winds are—hot season and rains—west and south-west. I shall have occasion to refer to this outbreak of Anthrax among the cattle in my remarks on the cause of the outbreak in the Carabineers.

Temperature.—The following table will show the mean temperature of Mhow:—

January....	66·3	May	86·9	September ..	76·2	Annual mean, 6·70	
February ..	71·2	June	79·7	October	77·0		
March	77·7	July	77·1	November ..	71·0		
April	85·1	August ...	75·7	December ..	67·9		

Rainfall.—The average rainfall is about 31 inches, and up to present date it is registered at the station hospital as 18 inches.

Camping-grounds.—The camping-grounds are along the bed of the Gumbheer Nullah. Mhow is scantily wooded, and the trees rarely attain any great size. At the north side of the camp, cultivation is carried on to a fair extent, and the grass-cutters have free access to obtain hariala or green grass from any district they elect to proceed to. The usual crops are grown upon the black cotton soils.

Short history of previous outbreaks of Anthrax of late years.—"Loodiana fever" occurred in 1883 in F Troop, 17th Lancers, on August 14th. One horse died on the 14th instant, another on the 15th instant, whilst another case proved fatal on the 16th August, 1883. Two more cases were admitted suffering from "Loodiana fever" on the 27th August, but these were from A Troop. One horse died at 4 a.m. on the 29th August; the other case did not prove fatal. The two troops were picketed out upon the race-course, but much nearer to the regimental hay-ricks and stables than the present encampment. Glanders was prevalent in 1884 and 1885, but no cases have been recorded since. The disease appeared among the troop horses and grass-cutters' ponies, a number of which were destroyed. This was the period during

which the late Veterinary Surgeon Twiss, Army Veterinary Department, was in veterinary charge, and active in suppressing Glanders. The other outbreaks of former years I cannot offer with official records from the veterinary hospital books; consequently I put them forward as information gleaned from some of the older employed Native establishments, who have remained in Mhow from one regiment to another. One muccudam "Samboo," with 38 years' service, 30 of which have been spent in Mhow, informs me that he well remembers some horses "dying with big throats," and, as he expresses it, from "Loodiana," when the 3rd Hussars were in Mhow, and during this outbreak he informs me the horses were picketed out behind the barracks for five weeks. Of course he has a better recollection of the outbreak in 1883, and is most correct as to the number and manner of disposal of the dead and place of burial.

He also informed me that in 1883 the sheep and goats in the various villages round Mhow died in hundreds after a short illness.

History of stables.—The stables now in use for the horses of the "Carabiniers" were originally built for barracks in 1830, and are very much after the French style. They consist of six stables numbered, respectively, 13, 14, 15, 16, 17, and 18, with outside standings next to each, whilst a greater space is left in the centre stables for the purpose of forming a double standing outside.

I am informed that in 1867 the horses were turned out of these stables, and a regiment of infantry located in the stables for some period. The present new barracks were completed about 1868. From the above register of buildings the composition and various dimensions can be seen. The cubic space allowed per horse amounts to 1,512, the square space for one horse being 112, whereas each in the new cavalry barrack gets over 1,750 cubic feet allowed; but a greater difference will be observed upon looking at the plans of the Royal Horse Artillery stables; a space for twenty horses contains the following:—

Cubic space for one horse	...	...	...	2,315
Square ditto	...	...	...	147

Upon looking at these figures, one is at once struck by the vast improvement now offered in construction of recent Government stables.

The European cavalry stables are extremely low, with the exception of stables Nos. 16 and 18 in the attached plan, which have corrugated roofs (iron). A great and appreciable difference is experienced by remaining a short period in each, for in the corrugated iron roofed stable a strong current is felt, whereas it is limited

in the others. I now refer to a time when the sun was not strong enough to affect the iron roof, and I find at this time the temperature only shows a slight variation. Each horse, when in his standing, has an archway in front of him and behind without doors, except jhamps at either end of the centre avenue.

The walls vary in construction. The floors are all made of one material, viz., "mhorrum," an excellent material, full of binding properties, which does not allow urine to percolate to any depth, and when dressed over with the usual dung-dressing, nothing could look cleaner and better. This condition was observed by the Inspecting Veterinary Surgeon, Bombay, during his visit in the outbreak. The corrugated iron-roofed stables have so far escaped the outbreak, although it raged most in Troop B, stable No. 17, a stable situated between the two iron-roofed stables.

Ventilation.—The plan of ventilation will be seen from hte attached plans.

Outside standings.—The outside standings are constructed of a similar material to the floors of the stables, but a layer of stones is deposited on each standing to keep them from being so easily worn out ; these are repaired by the syces.

Drainage.—The drainage is purely surface drainage.

Manure-pits.—The manure-pits are established at various situations around the lines, where the litter is collected and removed by a contractor, who sells it to the cultivators around the camp.

Grooming and clothing have been conducted on the service system.

Bedding consists of refused hay with the additional bedding allowance.

Selection of Anthrax Camp.—This was the race-course, on account of the previous outbreaks having been taken there, and the difficulty attended with moving out of cantonment limits and getting into Holkar State territory, thus running the risk of additional expense and litigation. Besides, the cantonment does not offer any other situation. The distance was over a thousand yards from the station veterinary hospital, perfectly open, and only had a village path upon which all traffic was suspended running through. The plan of field hospital is attached.

Forage supply.—Dry grass or hay was issued daily from the Commissariat ricks, and was of a fair sample, though not well harvested in consequence of the rains of the previous year interfering with the gathering ; it was somewhat discoloured, otherwise good, and the horses seemed to thrive well upon it. Some of the grass was harvested in the Commissariat rohruns, two of which exist on the south side of the camp—one measures 1,498½ acres, and the other 1,323¼, total 2,821¾, and producing annually 25

lakhs maunds; whilst the remainder of the supply, amounting to 59 lakhs maunds, is brought in by a contractor from the various rohruns round the district. Taken together, I consider this grass to be the best procurable in the district.

Hariala or green grass.—This grass is brought in daily by the grass-cutters from each troop; when brought in, it is spread in rows to dry before being given to the horses. There is a jamadar of grass-cutters to each troop, who is supposed to look after the grass-cutters and see they do not bring in rank or foul grass. The grass-cutters appear to go in all directions in search of grass, and to be at liberty to gather it from any spot they choose.

I have made various excursions to see the places from where the hariala grass was procured, and the only conclusion I can arrive at is that almost all was gathered from nullahs and banks of the rivers. The grass seemed to be of the usual quality for the period of the year, containing a number of long coarse stems. It was always well dried before being issued as a ration, and the allowance of grass-cutters was according to regulation.

Experiments have been carried out with this grass, with a result that I shall again refer to in my remarks at the end of my report, in summing up my opinion and suggestions about the outbreak.

Bran.—An allowance of one pound daily per horse had been issued at my recommendation; the same was in lieu of an equal quantity of grain and not as an additional issue. The bran was generally of a good quality, fresh, and containing no dirt or foreign bodies.

Gram.—The remainder of the grain ration was made up of gram, which was a departmental supply and issued by the Commissariat Department. The grain appeared to be mixed, some old and some new grain,—otherwise it was an average sample. This *same* supply had been in force for a period of some months, and had not been changed at any time.

Salt.—The regulation issue had been doubled at my recommendation on account of the horses being in such poor condition after the camp of exercise. I noticed a considerable improvement in condition of the horses after its issue. The increase was continued during the rainy season.

(*To be continued.*)

Editorial.

HALF MEASURES IN SANITARY POLICE.

For the total suppression of transmissible diseases, well devised measures, founded on an accurate knowledge of the way in which they are maintained and extended, and energetically and thoroughly carried out, are necessary. When the diseases are wide-spread, or when they threaten to invade, from a centre, neighbouring regions which are under the control of local authorities, then to be effective these measures should be carried out in a uniform manner by, or under the direction of, the supreme government. The experience of this country has amply demonstrated the futility of half measures in dealing with the contagious diseases of animals.

For many years, several most destructive maladies were allowed to reign without let or hindrance, to the great injury of our Agriculture; and had it not been for the rude awakening from senseless apathy, which was experienced when the Cattle Plague had obtained a firm footing in Great Britain, in 1865-66, these scourges might yet have been as active as before that date. As it is, one has been abolished, but others yet linger in a harassing manner, and will probably continue to do so until the Government recognises its duty and proceeds to perform it. To delegate this duty to the disjointed and wayward efforts of local authorities is simply to trifle with the business, and produce dissatisfaction, inconvenience, and needless expense, while the object which is sought to be attained will remain as far off as at the commencement. We are having another repetition of this unwise and unprofitable, as well as vexatious, desultory legislation, in the attempt made to check the prevalence of Rabies. Notwithstanding all that Veterinary Science has done in indicating how this disease should be dealt with, in order to entirely free the United Kingdom from it, and to prevent it invading the country again, and in the face of the evidence laid before the Select Committee of the House of Lords by those most competent to give an opinion on the subject, the old tinkering legislation is apparent in the Privy Council order issued on July 9th.

The malady appears to be on the increase again in some of the Northern Counties and in Middlesex, and deaths from Hydrophobia have been more frequent lately. From the Annual Report of the Agricultural Department of the Privy Council for last year, we learn that Rabies was practically limited to two areas in the country--one in which it is continually existent, a district including the Counties of Lancashire, Cheshire, Staffordshire, Derbyshire, and West Riding of Yorkshire; the other comprising Counties which are close to the Metropolis and including in it Middlesex, Essex, Surrey, Sussex, and Kent. The total number of cases reported during the year was 176, of which 166 were divided between the two areas named, the remaining ten occurring beyond these, we may suppose.

It is remarked in the report: "That the disease might have been extirpated in the two groups of counties to which it was confined, is hardly a matter of doubt; but without the alarm engendered by an extensive outbreak, no restriction on the movement of dogs can be maintained, and we shall doubtless continue to repeat the system of checking the affection and allowing it to spread again as soon as the excitement is allayed. A repetition of the repressive measures is likely to be required soon, as Rabies is steadily spreading in the Metropolis and its vicinity, in the absence of any regulations."

The recent order merely applies to the City and Metropolitan District, and enforces muzzling on all dogs except those actually at work during sport or the capture of vermin; all dogs without muzzles are to be seized and, if not claimed, slaughtered, while those affected with, or suspected of, Rabies, or which have been bitten by a rabid dog, are to be destroyed. This local measure is only to be carried out during the current year, and it may be more or less successful in the very limited area in which it is applied. But it is perfectly evident that it will effect nothing in getting rid of the plague, while it will cause much hardship and annoyance.

When shall we have a Government sufficiently enlightened and resolute to undertake the thorough eradication of this and the other contagious disorders of domestic animals which cause so much embarrassment and loss to the country? It would seem as if governments cannot initiate or lead, they must be driven.

COLIC IN THE HORSE CAUSED BY THROMBOSIS AND EMBOLISM (EMBOLISM OF THE THREE BRANCHES OF THE ILIAC ARTERY, NECROSIS AND ULCERATION OF THE MUCOUS MEMBRANE OF THE CORRESPONDING PART OF THE INTESTINE, PERITONITIS, SEPTICÆMIA).

BY PROFESSOR FRIEDBERGER, MUNICH VETERINARY SCHOOL.*

On the 21st February, 1889, a seven-years-old chesnut mare was brought for treatment to the Munich Infirmary for Horses. It was stated that eight days previously the mare suddenly lost her appetite and coughed a little. Without any treatment the appetite quickly returned, but the mare did not improve. For several days before she was brought her appetite had again become bad, and at last had almost entirely disappeared, whilst at the same time the animal appeared dull and low-spirited. As the owner had brought on the 10th January, 1889, another horse into the hospital on account of Lobular Pneumonia of the left lung (Chest-plague, *Brustseuche*, of German authors), the mare which he now brought, although the temperature in the rectum was only 39·2° C., and no affection of the lung could be detected, was considered for the time being as possibly sickening for the same disease, and was put into a separate stall. On the following day examination of the patient showed the following state of things:—

In moderately good condition; ears and extremities cold; visible mucous membranes of the head pale and lead-coloured.

* Translated from the *Deutsche Zeitschrift fur Thiermedicin und Vergleichende Pathologie.*

Pulse 94 to 100 per minute, small, hard, equal in force but irregular. Heart's impulse on the left side increased and felt over an extended region; heart's sounds normal.

Temperature in the rectum 40·8° C. Respiration 20 per minute, moderate. Nothing morbid to be detected in the large bronchi. No cough, and difficult to produce cough. Percussion everywhere over the lung is clear and full. On auscultation a loud vesicular murmur is to be heard. Cavity of the mouth warm, dry. Tongue covered with a pasty, whitish, sweet-smelling fur. Appetite bad. Thirst small. (The animal took scarcely a third of the quarter ration of fodder which was offered.) The back part of the body had fallen in the region of the upper flank. In the lower part it was tense and strongly tucked up. Bowel gurgling was hardly perceptible. Very little excrement was voided, and what there was of it was in loose balls, which were shiny, owing to their being covered with mucus and a yellowish-grey pseudo-membranous coagulum, which was soaked with moisture and smelt very badly. The urine was strongly acid, and contained two per 1,000 of albumen. Microscopically, it was seen to contain white corpuscles, yellowish-brown, rounded renal epithelium, of which there were, on an average, five to six pieces on one field of the microscope, and numerous oxalate crystals. The mare showed considerable muscular weakness, and was very dull.

In the further course of the day it was observed that the bowel gurgling frequently changed, sometimes being very weak, at other times very loud. Excrement was voided somewhat regularly, about every four hours, but always in small quantity and of the consistence described above. The urine was seldom voided, and always in small quantity. The patient often lay down, and whilst recumbent was quiet; but she only lay for short intervals, and emitted low moans.

Treatment consisted, in addition to appropriate diet, in giving 40·0 antifibrin with 30·0 cinchona bark, pulv. rad. althea, made into an electuary, and given twice within two hours. In addition the animal was given 300·0 of alcohol in its drinking-water within twenty-four hours.

2 p.m. Pulse 90; temperature 39·8° C.; respiration 20. 6 p.m. Pulse 90; temperature 39·9° C.; respiration 24.

2. Early on the following morning pulse was 90 to 100; temperature 40·0° C.; respiration 18.

Pulse exceedingly small, hard, and thready; heart's impulse on the left side abnormal. Appetite entirely absent, only a few pieces of bread being taken. The back part of the abdomen still greatly tucked up. Exceedingly sensitive to pressure in the region of the ribs. (Whether this was an expression of pain could hardly be ascertained with certainty.)

Intestinal gurgling continued to change very much in degree, sometimes being entirely absent. Less and less excrement was voided, its consistence being that of the previous day. The general muscular weakness was increased, and the expression of face was still more strikingly one of suffering. The patient again received 300·0 of alcohol in her water, and an electuary containing powdered digitalis leaves 6·0, cinchona powder 30·0.

After 2 o'clock p.m. slight signs of restlessness appeared. The horse often pawed, lay down for short intervals, and again quickly sprang up. On examination per rectum there was felt pressed against the small pelvis part of the intestine (pelvic flexure of the colon ?), somewhat strongly distended with gas. When touched this piece of bowel was decidedly painful, for the animal moaned and endeavoured to withdraw itself from the manipulation. Pressure on the parietal peritoneum did not appear to give pain. At this time well-marked trembling of the extensor tendons of the elbow and of the muscles of the thigh were observed. The animal drew its hind-quarters together and

threatened to throw itself down. At 6 p.m. the pulse was still about 100; respiration 24 per minute; temperature in the rectum 46·4°C.

3. Third day. In the morning pulse 120; temperature 41·2°C.; respiration 30. The maxillary pulse was scarcely to be felt, and it was very unequal and irregular. Heart's impulse compressed (*drohnend*). The animal was covered with perspiration, which was cold and tenacious. The extremities were icy cold. What was visible of the mucous membranes was bluish red. Peristaltic action of intestines sluggish; very little excrement voided. Symptoms of colic more violent, and at shorter intervals. Muscular weakness and depression are excessive. The physiognomic expression, which had hitherto been one of anxiety, is now stupid and dull. The animal died at midday.

Twenty-five hours after death a *post-mortem* examination was made by Professor Kitt, and the following appearances were noted: The carcase moderately distended. Subcutaneous fat sparingly developed; subcutaneous tissues and muscles destitute of blood. Lungs full of blood, and with isolated blood deposits under the serous membrane, without any other morbid changes. Similar extravasations were found under the parietal pleura. Heart of usual size, and containing a little blackish-red, coagulated, glutinous, and strongly staining blood, which penetrated the endocardium, as well as the inner surface of the large vessels. The heart muscle was washed-out-looking greyish red, appearing as if it had been boiled; it was unusually friable. In the peritoneal cavity there was about a quarter of a litre of fluid blood. The position of the intestines was normal, but a portion of the ileum about 25 cm. long was glued by a fibrinous exudation to the great omentum, which was full of blood, and in the vicinity of the entrance to the smaller pelvis with the serous covering of the abdominal wall. The adhesion could easily be loosened, and it then appeared as if the peritoneum, to which this exudation partly adhered, was itself filled with a vascular network, and was red, dull, and slightly muddy in appearance. The stomach was somewhat fully distended with gas; it contained bright green-coloured and somewhat fluid contents, the mucous membrane of both portions being without any considerable morbid change.

The small intestine contained in its lower portion a considerable amount of fluid. The duodenum and jejunum showed nothing remarkable, except a strikingly pale, sodden mucous membrane, covered with partially detached white epithelial *debris*. The ileum was in the same condition as far as a part about three metres before its junction with the cæcum. Here the serous covering of the bowel, for a length of about three-quarters of a metre, was partly covered with a vascular network, which was partially reddened in spots and covered with thin fibrinous patches of a bright yellow colour, and varying in size. When this was removed the surface was seen to be rough and dull. Between these places there were spots as large as the palm of the hand, which were very slightly inflamed, appearing smooth and shiny, and through which the dirty brownish colour of the other parts of the intestinal tube were visible. In the neighbourhood of the insertion of the mesentery there were frequently to be observed, in addition to congestion of the small vessels with blood, very minute extravasations and yellowish brown exudations under the serosa. The corresponding part of the mesentery was similarly affected, especially in the neighbourhood of the bowel and in the course of the larger vessels. The contents of the part of the bowel which was thus altered in appearance consisted partly of a thin yellowish brown and partly of a thicker red-brown to almost a chocolate-coloured mass.

The intestinal wall was of varying thickness, being in some places three times as thick as in the normal condition, the swelling being chiefly caused through a dirty red or black-red sanguino-serous effusion into the intestinal

wall (submucosa). The mucous membrane, of which the ground tint was a dirty brown-red, showed in spots a bright yellowish, often an almost ochre-yellow colour, and the surface was very uneven. Looked at from the surface, it appeared as if it were covered by a deposit of exudate, but when examined more closely the brighter spots were seen to be due to superficial necrosis of the swollen mucous membrane. The necrosed mucous membrane appeared rough, and thickly fissured over a large extent of surface, or the necrosis occupied numerous rounded parts as large as a shilling.

The margins of the destroyed mucous membrane were separated by a suppurating border, and were raised above the level of the neighbouring congested tissues which had not been destroyed, while the isolated, flat, palm-shaped, mortified parts were surrounded by an ulcerated surface covered with a dirty-grey pus, with which blood was frequently mixed. When the attempt was made to raise such a necrosed part, even although it was as much as four millimetres in thickness from the underlying tissue, it could be done successfully only by employing considerable force, an ulcerated surface being left behind. It was thus evident that we had to deal with a mucous membrane which was necrosed through its whole thickness. As regards the large intestine, the rectum showed minute extravasations of blood under the serosa, and there were also remarkable changes in the pelvic flexure of the colon. Its peritoneal covering was of a scarlet red, in consequence of the smaller vessels being filled with blood. The wall of the bowel appeared thickened two to three fold, through effusion of bloody serum in and under the mucous membrane (hæmorrhagic infarct). The contents of the intestine were dark red, owing to a considerable mixture of blood (hæmorrhage into the bowel through diapedesis). These changes gradually became less marked towards the left portion of the bowel, and there were no signs of any change in the position of the intestine (twisting on axis, etc.).

Examination of the anterior mesenteric artery and of the vessels which are derived from it showed the following changes: The upper colic artery and the region of the iliac branches showed nothing abnormal. The ileo-cæco-colic artery was the subject of a fusiform widening, and was almost filled with a large thrombosis as thick as a man's thumb. The thrombosis had a smooth, rounded, even surface, and was adherent only at a few points to the very loose, greyish-white, thickened, cicatricial-looking, and somewhat raw surface of the vessel. It was continued for a half-centimetre long as a somewhat thick projection into the origin of the interior colic artery and adjoining upper cæcal artery, whilst the lumen of the remaining branches given off by the anterior mesenteric artery were free. We had therefore to do with a thrombus which more or less completely blocked the entrance of the two above-named arteries. Its consistence was somewhat firm, the colour on section looked pure white, but the laminated arrangement was not strongly marked (white thrombosis).

Corresponding to the diseased part of the ileum, with its mesentery, there was found in the three corresponding branches of the iliac artery, and riding immediately over their bifurcations, a fork-shaped embolus about one centimetre long. These emboli were greyish yellow, firm, dry, and unmistakably laminated; they appeared to completely block the lumen of the arterial branches. There was attached to them blood coagula of somewhat recent and also of very recent date, so that the affected vessels were thrombosed from the point of division for a distance of ten to twenty centimetres towards the root of the mesentery.

In the arteries of the pelvic flexure of the colon no emboli were seen.

The liver was very slightly enlarged, coloured a greyish yellow, its edges rounded, the lobular marking obliterated, and it contained a very small quantity of thin frothy blood. The spleen was somewhat swollen, and thickly

set with nodules, some as big as an apple, which projected from the surface. Its tissue was full of blood, the nodules consisting of black-red sanguineous collections. The kidneys were of normal size, loose and soft, and coloured a dirty deep red. On section the medullary substance was found to be remarkably pale and clay-coloured.

REMARKS.

When the patient was first taken into the hospital it was considered to be possibly a case of Chest-plague, and there were certain facts which seemed to justify the supposition; but on the second day examination and observation of the animal showed that this suspicion was not justified, the symptoms pointing chiefly to an affection of the bowels (Enteritis). The striking and remarkable sympathy of all the parenchymatous organs, namely, of the heart, kidneys, and muscles of the skeleton, and the central nervous system, a sympathy such as usually accompanies infectious diseases, was attributed to a septic infection of the blood, having its origin in the diseased bowel. When on the second day appearances were manifested which pointed unequivocally to the presence of infection of the peritoneum the diagnosis was made of Entero-peritonitis. As to the cause of the illness we could ascertain nothing. The clinical symptoms, however, pointed so closely to the effects which are known to follow thrombosis and embolism of the intestinal arteries, with the necrosis and ulcerations which they cause, that we were driven to inquire as closely as possible regarding the first symptoms of the illness. This inquiry elicited the fact that in the beginning the animal had suffered from slight temporary Colic. On this ground we considered ourselves justified in suspecting a thrombosis or embolism of the intestinal arteries as the cause of the malady.

The *post-mortem* examination confirmed in the main the diagnosis made during life.

The changes in the ileum must be referred to the embolism and thrombosis of its blood-vessels. No doubt can exist regarding the derivation of the emboli from the thrombosis of the distended mesenteric artery, although at the time of the *post-mortem* inspection absolute proof could not be discovered by examination of the surface of the thrombosis. Several adjacent arterial branches which supplied the bowel were completely blocked up by pieces of the thrombosis, which were carried into the circulation. This led to severe disturbance of the circulation of the blood in the corresponding parts, and in the end caused the death of the animal. The possibility of the blood supply being carried on in an affected part of the bowel by collateral circulation was not possible on purely anatomical grounds, as a compensating blood supply could only take place from the neighbouring free arteries in the anterior and posterior surfaces—that is to say, only to a limited extent. Absolute arrest of the circulation took place in the vessels, and as a result there was severe disturbance of nutrition, death at some parts, and at others ulceration of the mucous membrane; and by transference of the morbid products to the peritoneum there was caused a limited, partly adhesive, and partly hæmorrhagic serous Peritonitis. The result of this condition was Septicæmia, with its injurious influence on the heart, producing Myocarditis, and on the kidney, resulting in Parenchymatous Nephritis. As is known, blocking of the arteries through thrombosis and embolism causes changes of this kind most frequently in the large intestine, where we ourselves have several times observed and described it.* It is more rarely found, particu-

* "Lehrbuch der Spec. Pathologie und Therapie," Friedberger and Fröhner, 2 Aufl., Bd. ii., S. 170.

larly when caused by embolism, in the small intestine, and most rarely of all in the ileum.

Buch has shown how a portion of the intestine cannot easily, and in any case only in very special circumstances, be permanently and completely deprived of its blood supply. To cause this result in the small intestine it is certain that there must always be a blocking in several adjacent arteries. This happens most readily through the prolongation of a plug in the affected and enlarged arteria, ilio-cæco-colica, into the iliac arteries, that is by a thrombosis. It is much more difficult to produce this result through multiple embolisms of adjacent intestinal vessels, as has been the case in the patient whose history we have been describing.*

That the disturbance of the circulation in consequence of embolism and thrombosis of the intestinal arteries, as well as the general condition of colic produced by thrombosis and embolism, is chiefly due to the anatomical conditions cannot be denied; but from the clinical side there are certain points which it is impossible to overlook, as, for example, the fulness of a part of the intestine, the nature of its contents, the strength or weakness of the heart's action, etc.

As regards the morbid appearances found in the pelvic flexure of the colon, the immediate cause must be ascribed to a disturbance of the circulation. In the present case we are unable to state whether the condition was due to occlusion by thrombosis of the one (inferior) colic artery, or by an embolus which had been swept into the vessel by the force of the circulation.

PLEURO-PNEUMONIA IN QUEENSLAND.

REPORT OF THE COMMISSION.

The following is the report presented to the Colonial Secretary, Brisbane, by the Royal Commission appointed to inquire into matters relating to the cultivation of the vaccine of Pleuro-pneumonia, together with the report of Dr. Germont and M. Loir on the results of their recent experiments:—

To the Hon. the Chief Secretary.

Sir,—In accordance with the instructions contained in your letter of the 16th of November last, whereby we were requested "to inquire into the origin and development of Pleuro-pneumonia in horned cattle with special reference to the cultivation of a vaccine for that disease," we have now the honour to furnish you with our report of the proceedings and investigations that have been carried on in reference to the above subject since that date.

On arrival of the French scientists, Dr. Germont and M. Loir, and after consultation with them we made the necessary arrangements for fitting up a temporary laboratory in the old Immigration Barracks, and also obtained the sanction of the Chief Inspector of Stock to make use of the sheep quarantine ground for the purpose of keeping the animals to be experimented upon under continuous observation.

As much of the necessary apparatus as could be obtained in the colonies was procured at once, and the remainder ordered by cable from London. Owing to the special nature of the inquiry most of the instruments had to be made, and we were therefore not able to equip the laboratory as quickly and fully as was desirable, but owing to the kindness of Dr. Germont and

* Deffke has published a very instructive history of thrombosis of the intestinal arteries in a horse which died of Colic (*Rundschau auf dem Gebiete der Thiermedicin*, 1887, S. 390.)

M. Loir, who placed the whole of their apparatus at our disposal, we were enabled to proceed with the experiments without any delay.

On the 16th day of November, a bullock diseased with Pleuro-pneumonia, was found on the run of Mr. De Burgh Persse, of Tabragalba, and an ample supply of virus obtained from it for the commencement of the experiments. The taking of the virus under all the precautions necessary for obtaining it in an uncontaminated state and free from contact of impure air was fully explained to us by Dr. Germont and M. Loir, and we at once saw the necessity for a totally different method of procedure from that usually adopted. As it is upon the entire exclusion of all impure or foreign germs from the virus thus obtained that the success of the future operations, especially in regard to the preservation of the virus, depends the absolute necessity for the strictest care and cleanliness is self-evident; and we would call the attention of all those interested to this most vital point in making any preparations for the purpose either of transmitting the virus or for inoculation.

We may here mention that the virus obtained from the Tabragalba bullock was kept for some weeks not only at the ordinary temperature of the laboratory, ranging from 75 deg. to 100 deg. Fahr., but also in an ice-chest at a temperature of from 35 deg. to 40 deg. Fahr., and that it was found to be fully effective in both cases for a period of seventeen days from the date of taking. After that term it appeared to gradually lose its strength. At what age it would become totally ineffective was not ascertained. As under the present improved postal arrangements tubes of virus could be transmitted to any part of the colony within three weeks, and as other and more important points were pressing for solution, we did not pursue the investigation of this subject any further. It is, however, a very important part of the inquiry, and we recommend that in any future experiments special attention should be directed to it.

The accompanying report of Dr. Germont and M. Loir sets forth the progress and result of their experiments in such a clear manner that any addition to it by us would be almost superfluous. From the large number of animals operated upon (forty-seven in number) the experiments were rendered much more trustworthy than if single cases had been taken, and in view of this, and noting the extreme care and accuracy with which the whole series of experiments were conducted, as also the absolute refusal on the part of the scientists to take anything for granted that was not fully demonstrated by experiment, we are of opinion that the conclusions arrived at and embodied in the enclosed report are fully justified.

In reference to the isolation and cultivation of the microbe of Pleuro-pneumonia, which has, as yet, not been actually demonstrated, we are of opinion that sufficient evidence has been obtained by Dr. Germont and M. Loir to warrant us in stating as extremely probable that even if the specific microbe cannot actually be isolated, still that a cultivated virus can be produced which will give the desired result. The experiments made on animals inoculated with an artificially-cultivated virus obtained from the blood of a calf dead of Pleuro-pneumonia have given results which are very promising, and which we hope will soon be confirmed beyond a doubt by the discovery of the specific microbe of Pleuro-pneumonia.

We are informed by Dr. Germont and M. Loir that their report is to be taken as an interim one, and made especially for the general public of Queensland. A fuller and more scientific one will be issued from Paris after laying their views and conclusions before M. Pasteur and obtaining evidence upon certain points which it was impossible to get in so short a time and with the limited means at their disposal in the colony.

Considering the successful issue to which these preliminary experiments have been brought, and with the knowledge that through them an immense

benefit has been conferred upon the cattle-owners of Queensland, we recommend that an honorarium of £1,000 in addition to the sums stipulated for, and already paid, be granted to Dr. Germont and M. Loir.

We think this report would not be complete without our calling your attention to the great advantage that would be conferred upon cattle-owners by giving practical effect to these investigations and thus placing a supply of pure virus at all times at their disposal. To do this it would be necessary to continue the present arrangement, and if the services of a competent person could be obtained there is every probability of the institution becoming self-supporting through payment being made by stock-owners for pure virus. A certain definite and valuable result has been obtained from the experiments just concluded, with a promise of still further developments being made. To let the matter rest now would, in our opinion, be a waste of both time and money, and we therefore respectfully make the following suggestions:—

(*a*) That a site be granted for the establishment of a permanent laboratory.

(*b*) That suitable buildings be erected thereon for conducting experiments on all diseases of stock.

(*c*) That the services of a thoroughly skilled scientist be secured as soon as possible for the purpose of continuing the preparation of virus as suggested in Dr. Germont and M. Loir's report, and eventually to take charge of the permanent institution.

(*d*) That power be given to sell virus to stock-owners requiring it.

(*e*) That the present board be authorised to prepare and print an illustrated pamphlet, containing as much information as can be obtained for sale to the general public.

It may not be deemed outside our province to refer to the fact that, as the cost of these experiments has been defrayed from a fund contributed solely by the stock-owners of Queensland, the investigation is to that extent a private one. The knowledge gained from, and the advantages sure to follow, these investigations will directly benefit every stock-owner in Australia, and indirectly the whole community. In view of this we may be permitted to suggest that the other colonies on the Australian continent may be invited to contribute towards the cost of further inquiries in the same direction, from which they must ultimately derive an equal benefit with Queensland.—We have the honour to be, sir, your most obedient servants,

EDWARD PALMER, Chairman.
JOHN THOMSON, M.B.
JAMES TOLSON.
P. R. GORDON.

REPORT OF THE FRENCH SCIENTISTS.

The following is the report by Messrs. Germont and Loir (M. Pasteur's representatives) upon their inquiry as to the protection of cattle against Pleuro-pneumonia (translated from the original in French by Mr. H. S. Dutton):—

Brisbane, March 20th, 1889.

At the request of the Government of Queensland we have endeavoured to solve the following problem:—To find a means which will allow stock-owners to procure for themselves at any season of the year a sufficient quantity of virus to enable them to inoculate a mob of cattle against Pleuro-pneumonia.

The best solution would be to be able to cultivate artificially, in an appropriate medium, *in vitro*, the virus of Pleuro-pneumonia. As this disease is infectious and contagious, it is probably caused by a living agent—a microbe. But up to the present all the numerous efforts undertaken to isolate and cultivate this microbe appear to have failed. It would, therefore, have been

rather presumptuous on our part to have limited our researches to this particular point with any hope of success; a study of this nature demands, in effect, special and complete laboratory arrangements, many tentative researches, and depends much on chance.

We have endeavoured to surmount the difficulty by adopting another course.

Resembling in this point the majority of other contagious diseases, Pleuro-pneumonia can be transmitted by inoculation. If under the skin of a "new" animal—that is to say, of an animal which has not already been subjected to the attacks of the disease—a few drops of virus collected from the lung are injected, an œdema develops itself at the point of inoculation, which spreads considerably and generally causes death. In its turn this œdema is infectious, and can be used to practice fresh inoculations on other animals, these inoculations giving rise to the same phenomena.

Starting from this fact, which has been recognised for many years, we have considered that the liquid constituting this subcutaneous œdema could be used for inoculations at the tail, after the Willems method, as it is practised throughout the world.

But at the beginning we have to reply to an objection.

We were told that this subcutaneous œdema following inoculation has nothing to do with Pleuro-pneumonia, that it is a new and different disease, a kind of Septicemia; that by inoculation the original disease can never be reproduced with its ordinary anatomo-pathological characteristics; that, in a word, it is impossible to cause either Pneumonia or Pleurisy.

We reply, first of all, that it is a mistake to believe that the specific character of a disease consists in an habitual anatomical localisation. In Tuberculosis, for example, the usual seat of the disease is the lung, but cases of Tuberculosis without pulmonary lesions are frequent, and it is even possible to produce a generalised tuberculous infection without tubercles. There is not always a rash in Scarlatina, nor always an eruption in Measles, and the subcutaneous inoculation of the Diphtheria microbe gives no diphtheric angina.

On the other hand, we have frequently been able to provoke Pleurisies with production of false membranes by the direct injection of virus into the pleura, or even by a simple subcutaneous inoculation. In one case we have been able to reproduce a veritable Pleuro-pneumonia by bringing the virus directly in contact with the lung by an inoculation in the jugular vein. Nevertheless, we recognise the fact that in the case of subcutaneous inoculation only a local œdema is generally provoked.

But the liquid contained in this œdema has this peculiarity in common with virus taken directly from the lung: that if it is virulent for horned cattle it appears to have no effect on other animals. As Willems says, "The virus of Pleuro-pneumonia is of a specific nature . . . the bovine race only is affected by its inoculation, for other animals of different kinds inoculated in the same manner and with the same liquid feel no bad effect."

We have in the same way been able to inject large doses of subcutaneous virus under the skins of fowls, pigeons, guinea-pigs, and goats without the least appreciable effect, while this virus inoculated in the skin of young calves reproduced the same œdema.

In any case this discussion is a barren one, and if the experiments we have been able to carry out prove that subcutaneous virus protects in the same degree as natural virus, this practical result will justify the disregard of any more or less specious theoretical objection.

We have thus considered that by subcutaneous inoculation it was possible to cultivate, so to speak, the virus of Pleuro-pneumonia, and to have always at hand the materials necessary for practical wants. We have considered

that it would be possible to do for Pleuro-pneumonia something analogous to what has been done for nearly one hundred years past for vaccine. The virus of vaccine cannot be artificially cultivated in a medium devoid of life, and to preserve it it is necessary to have recourse to successive inoculations from calf to calf, or from man to man. It is known, on the other hand, that vaccine can bepreserved for some time in specially prepared tubes, or on strips of glass, ifit is collected under proper conditions.

Had the same thing been possible for Pleuro-pneumonia, the problem submitted to us would practically have been solved.

The questions which we had to study were the following :—

1. Can sufficient virus be obtained by inoculation under the skin to inoculate a mob of cattle in the tail ?

2. Does this subcutaneous liquid, when it has been inoculated in the tail, protect the animals so operated upon against a second attack of the disease as effectually as the natural virus collected from the lung or from the pleura ?

3. Can the virus be preserved, and if so, how long ?

(*a*) When an ox is inoculated in the tail with Pleuro-pneumonia virus, in the great majority of cases nothing is provoked but a slight local swelling, which disappears rapidly. Sometimes, however, the œdema extends to the upper portion of the tail, from there to the adjoining parts, and death is frequently the result of this complication. What is the exception after inoculations as they are made in practice is the rule if the virus be injected under the skin of the neck, or of the thoracic walls, in those parts which veterinarians designate for this reason "forbidden regions" (Bouley). However, even under these conditions death does not always ensue, and the œdema remains sometimes very limited in extent. To obtain large œdemas with the greatest chances of death, operations on animals which are too old must be avoided, and calves of from six to twelve months old must be chosen in preference. Very young calves are not suitable subjects for experiment. They have not sufficient resisting power, even when they are nourished with milk ; and, moreover, it would appear that the malady tends to generalise itself, to assume abnormal forms, and to kill by general infection without localisation. With adult animals there is the risk of operating on animals which have already been attacked by the disease in a form more or less light, or actually attacked by a different disease, Tuberculosis, for example. However, all conditions being equal, calves are more susceptible than adult animals. Operations on thin and impoverished animals must also be avoided ; besides the fact that the disease may follow an abnormal course, the skin of such animals is deficient in suppleness, and the œdema never contains such a large quantity of liquid.

When inoculation is performed under the skin of the thoracic walls of a young calf—behind the shoulder, for example—with some drops of virus taken from the lung or the pleura of an animal which has been killed during the second period of the malady, a slight swelling is observed after between five or ten days, or sometimes a little later, which increases during the following days both in thickness and in width. This swelling is painful when pressed, and as it expands the temperature becomes progressively higher. At the end of one or two weeks the swelling ends by covering the whole of the abdomen, extending sometimes from the pubic (share-bone) to the middle of the breast-bone, and even to the neck. Generally, however, it remains limited to the side of the body on which the operation was performed. On a level with the parts last attacked the œdema is soft, whereas on a level with the regions first involved it becomes harder and harder. The temperature, which under normal conditions averages 102 deg. to 102·5 deg., rises during the second week after inoculation to 105 deg., 106 deg., sometimes 107 deg., or even 108 deg., Fahr. It often decreases one or two days before death.

In spite of their feverish condition, the animals continue to eat and to ruminate, and it is only during the last days of the disease that they refuse all nourishment, and that rumination ceases. Death supervenes without convulsions.

On opening the body, if the skin on a level with the œdematous parts be carefully dissected in such a manner as to form a sort of bag where the lymph accumulates, it is seen that the latter exists in very considerable quantities; sometimes more than two or three pints can be collected. This lymph, which abounds more especially on a level with the parts last attacked, is of a beautiful amber colour, almost limpid, and in no degree mixed with matter. On a level with the parts first attacked the lymph is not abundant, and the tissue is thicker.

Occasionally the inflammatory process spreads into the thoracic cavity, which it penetrates in following the vessels of the neck, and at the opening of the thorax a more or less abundant pleuritic discharge is found, with production of false membranes.

Animals do not always succumb to the consequences of inoculation, and the chances of survival are all the greater, as the animals are of a more advanced age. The nature of the virus and the quantity injected must also be taken into account.

The following is a brief résumé of the experiments we have made on this particular point:—

With virus collected at Tabragalba from an ox killed at the second period of the disease (Red Hepatisation) we inoculated two calves, which died at the end of three weeks with a very considerable œdema. With the lymph collected from one of them we inoculated three others, which died likewise after an illness of twenty to twenty-eight days. With the lymph taken from one of the latter we again inoculated a lot of four calves, of which one showed only a very limited œdema, two showed an œdema of considerable size with High Fever, and ended by getting better; the fourth died.

An ox of three years old, very thin, inoculated later on with the lymph of a calf which had died after inoculation with virus kept for a month, became very ill, developed a large œdema, and also recovered.

So that out of ten animals inoculated with fresh virus, or virus kept for only a very few days, we had six cases of death; two cases with very considerable œdema, which could have been utilised had the calves been killed at the time when the disease was in full evolution and the temperature was between 105 deg. and 106 deg. Fahr. In two cases the œdema could only be utilised for a restricted number of inoculations.

With the virus which we collected at Monsildale we inoculated nine animals of different ages, from one year to three years. Four only died. Two calves of one year old had a very large œdema, but recovered; one heifer of three years old developed a very limited œdema; the two others showed a larger œdema, but they also recovered.

To what must this difference in the result be attributed? Why did the virus collected at Monsildale prove itself less active than that collected at Tabragalba? In the case of the ox killed at Tabragalba, the disease was in full evolution; while in that of the ox killed at Monsildale the animal had been ill for a long time—was perhaps on the way to recovery—and stock-owners have long known that the best virus is that obtained from an animal which has not passed the second stage of the disease.

It is, therefore, probable that lymph taken from an animal at different stages of the disease does not always possess the same virulence, and fresh experiments will perhaps show that the maximum of virulence is reached at the moment when the œdema continues to enlarge and the temperature varies between 105 deg. and 107 deg. Fahr. We think that at this moment

a calf possessing an œdema of large enough extent to satisfy practical wants can with all security be killed.

But, after all, it is not necessary to give too much attention to this difficulty, for if there is a large mob of cattle to inoculate it will be safer to inoculate two or three calves, and there will be at least one case of death with the requisite quantity of lymph.

(*b*) Does the subcutaneous liquid, when inoculated in the tail, protect animals against a second attack of the disease in the same degree as the virus taken from the lung or from the pleuro in a spontaneous case?

Willems, a Dutch veterinarian, was the first to affirm that animals inoculated in the tail with the virus of Pleuro-pneumonia are refractory to a second attack of the disease, and "brave epizootic influences with impunity." What is the proof of this assertion? If the manner of contagion of the disease were known, and if there were a certain means of communicating it, with its ordinary anatomo-pathological characteristics, this proof would be easily given; it would be sufficient to protect the animals and to show that they are refractory to the disease, while other unprotected animals do not resist it. But if this proof be wanting, we have on one hand the results of the practical experience of stock-owners, and in Queensland there is such a conviction as to the efficacy of the Willems method that we will insist no longer on this point. We have, on the other hand, the fact that animals which have been inoculated in the tail resist a second inoculation in a "forbidden part." We have just seen that if inoculation is performed in the neck or behind the shoulder of a "new" animal (one which has never had the disease, or which has never previously been inoculated) an œdema is caused which generally proves fatal. This inoculation produces, on the contrary, no effect if it has been preceded by an inoculation in the tail. This is a scientific fact which has been known for a long time, and it will suffice to read the articles of Professor Bouley (*Recueil de Médecine Vétérinaire*) to be convinced of its truth.

What we have to do is to prove that the lymph collected in the subcutaneous œdema possesses equally the same protective qualities as does lymph collected in the lung or in the pleura.

With this end in view we made the following experiments:—

We inoculated in the tail with subcutaneous lymph three heifers of one to two years old, and two bulls of one year old.

Two other heifers which were to serve as a term of comparison were also inoculated in the tail, but with natural virus collected at Warwick.

The animals inoculated with subcutaneous lymph underwent no perceptible inconvenience, only a very light swelling on the tail, exactly limited to the point of inoculation, appearing four or five days after the operation, and not lasting more than seven or eight days. The swelling was accompanied by light feverish symptoms, the temperature not rising above 104·6 degrees Fahr.

One of the heifers inoculated with the Warwick virus was affected in exactly the same manner, but in the case of the other one the swelling on the tail rose 1½ feet above the point of inoculation. Inoculation had been tried on this heifer with a slender glass tube, instead of using the syringe with which the others were operated on, so that a small bleeding wound had been made, and the bones more or less touched during the small operation. But the temperature followed exactly the same course as in the other cases.

We had now to submit these animals to the test of a second inoculation made this time in a "forbidden region." After an interval varying from six weeks to two months, these seven calves were, therefore, inoculated afresh behind the shoulder, with about two centimetres of virus, (about thirty-two

drops), collected at Monsildale from an ox suffering from Pleuro-pneumonia at the period of Grey Hepatisation.

The same day, with the same virus and with the same quantity thereof, a second lot of nine animals was inoculated for the first time, behind the shoulder.

Another lot of four calves, which had been used for previous experiments with the subcutaneous virus, and which, as we said above, had resisted an inoculation on a level with the thoracic walls, were also inoculated on the same day, and with the same dose, with virus collected at Monsildale. So that we had on the one hand eleven animals protected, and on the other nine unprotected.

The result of this experiment was as follows:—

Among the protected animals two had a very slight œdema at the point of inoculation, *and none died.* While of the nine unprotected ones four died with the ordinary œdema, four had an extensive œdema and recovered; one heifer of three years old had only a very limited and transitory œdema.

The conclusion to be drawn from this experiment is a dual one. It shows first of all that subcutaneous virus and natural virus collected in a spontaneous case of Pleuro-pneumonia have the same effect, and that their use is optional for protective inoculations in the tail. But this experiment shows us, moreover, that the protection is incontestable; it gives a new scientific confirmation to the data furnished by observation and by practical experience. Stock-owners have noticed that animals inoculated in the tail can, as Willems says, "brave epizootic influences with impunity." We have proved once more that animals so inoculated could resist an inoculation which kills four-ninths of unprotected animals.

There is no doubt that the demonstration would have been still more conclusive if we had been able to procure a more active virus than that we collected at Monsildale, but it is sufficient as it stands.

We now find ourselves in possession of two leading facts: 1. By inoculation in a forbidden part of a young calf of from six months to one year old, a sufficient quantity of lymph can be obtained to inoculate from 1,000 to 1,500 head of cattle, at least. 2. This lymph protects animals inoculated in the tail by the ordinary method, against a fresh attack of the disease.

If, moreover, it be possible to preserve this lymph in a virulent state for a long enough period, it will be understood that any stockowner in the colony will be able for the future to procure the necessary virus to protect his animals.

Many processes have been suggested for the preservation of Pleuro-pneumonia virus. It has been proposed, for example, to mix it with glycerine or with different antiseptics; efforts have been made to desiccate it, etc. As these processes are known by everybody we will follow them no further; it is generally recognised that they are very uncertain, more often illusory, and sometimes even dangerous.

M. Pasteur's researches have taught us that the most corruptible organic matters—blood, urine, animal or vegetable infusions—could be preserved indefinitely without undergoing any putrefaction if precaution were taken to keep them sheltered from outside germs. By the same method M. Pasteur and after him all the bacteriologists have shown that the virus of various infectious diseases could be kept in a state of purity and with all their activity. Thus, to cite only one example, drops of anthracitic (charbonneux) blood can be kept for weeks and months without losing their first virulence.

Is it the same as regards the virus of Pleuro-pneumonia?

This we have endeavoured to decide; but during the short space of time which our researches have lasted, we have not been able to thoroughly sift the question, and many unknown facts remain to be elucidated. Besides,

animated as we were by the desire to arrive at a practical solution, accessible to everybody, we have endeavoured to render it as simple as possible.

We therefore collected, in a pure state, some samples of subcutaneous lymph in slender tubes which had been previously sterilised. Some of these tubes were placed in an ice-chest, while the others remained exposed to the ordinary temperature of the laboratory.

Our experiments were made with lymph seventeen days old, and with lymph preserved during one month—

(*a*) With the seventeen days' old lymph kept at the ordinary temperature of the laboratory, we inoculated two calves, of about one year old, behind the shoulder. One of them died with an enormous œdema, and the *post-mortem* examination made in the presence of Messrs. Gordon and Bruce showed that there was enough lymph to inoculate from 1,500 to 2,000 head of cattle. The other developed just as large an œdema, but after a long illness ended by recovering.

(*b*) With lymph kept during a month seven calves were inoculated behind the shoulder. Only one of these calves died with the ordinary large œdema (this one was inoculated with lymph preserved at the ordinary temperature). Two others had an œdema of considerable size (these were inoculated with lymph kept in an ice-chest) but survived. Four showed neither œdema nor rise of temperature. Although the doses of virus injected were comparatively weak (two or three drops), it appears from this last experiment that the virus has lost a large portion of its virulence at the end of a month. After fifteen or twenty days, on the contrary, it would appear to retain its primitive virulence.

It now remains for us to show what practical benefits can be derived from the knowledge of the facts which we have just set forth.

Let us suppose that in Brisbane, or in any other central place, a station is established where every fortnight two or three calves are inoculated either with virus collected from a case of spontaneous Pleuro-pneumonia, which must be done from time to time to *rejuvenate* the virus, or with subcutaneous virus taken from calves previously inoculated. Enough tubes of virus could be collected in a pure state to provide for all demands; these tubes it will be possible to send by post. With the virus thus obtained, stock-owners can sacrifice two or three calves, which would furnish the amount of lymph necessary for inoculations. Instead of having recourse to a central station, stock-owners could, if they preferred, collect a few tubes of virus from an animal killed on their runs, and send it to a distant station where no case of Pleuro-pneumonia existed, but where it was desired to inoculate a mob before making them travel. All that is required is a few sterilised tubes, a spirit lamp, and a small forceps.

To enable every one to proceed with certainty, we believe a few indications as to the means of collecting virus, and afterwards inoculating it, would be useful.

(*a*) If it is a case of spontaneous Pleuro-pneumonia the diseased lung should be uncovered, care being taken not to injure it with the instruments or with the hands, and the surface of the lung on a level with the point where it is desired to make the collection of virus should be burnt with a rod of heated glass. Having broken the point of a slender tube, the latter should be passed in the flame so as to destroy any germs which might exist on the outside of that part of the tube which is to penetrate the lung. When the tube has been pressed in, some drops of the lymph should be inhaled by slightly sucking, and the slender end of the tube should then be closed with the lamp. The virus keeps equally well if the two extremities of the tube are sealed at the flame, and under these conditions it is much easier to carry. If it is desired to collect the lymph which is often contained

in large quantities in the pleura it will be necessary to first expose the ribs, being very careful not to open the thoracic cavity. The side on which the pleuritic discharge is situated can be ascertained by sounding (percussion). The liquid is often contained in partitions formed of false membranes, but is always sure to be found after a few trials by sinking tubes in different parts of the chest. If tubes with large receivers are available it will sometimes be possible to collect several pints of virus, and to make use of it, after the lapse of a fortnight or three weeks, for inoculations in the tail.

As regards subcutaneous virus, it will be necessary first of all to break, by a smart stroke delivered with an ordinary hammer, for example, the meshes of the connective tissues in which the lymph is imprisoned. This simple act (*tour de main*) facilitates in a singular manner the collection of the virus, and has, moreover, the advantage of mixing the lymph with solid particles. Before sinking in the slender end of the tube, the hair and skin must be deeply burnt in order to destroy the germs existing on the surface.

The virus which it is desired to keep *should be placed in the dark*, and, above all things, exposing it to the direct rays of the sun should be avoided.

The animals which are destinated to furnish the virus should be inoculated in the neck or behind the shoulder, behind the shoulder in preference. It will be sufficient to break the point of the tube and to sink it under the skin by a slight twisting movement—the point would break if it were attempted to press it straight in. It would perhaps be preferable to use a hypodermic syringe, which would make the operation easier, more especially if the animals are difficult to keep still.

When lymph is being collected from an animal which has just succumbed, or which has been slaughtered, it is transparent and limpid, and only appears to contain a few very small granules. But after a short time the fibrine coagulates, and a cloud composed of the fibrine forms rapidly and unites all the solid particles contained in the liquid together. We believe it necessary to inoculate some of this solid matter, which appears to contain active parts of the virus.

About a cubic centimètre (sixteen drops) of virus should be inoculated.

The death of the animals inoculated should be awaited, but they may be slaughtered in full evolution of the diseased when the œdema appears sufficiently large for practical requirements.

The body resting on the healthy side, a wide incision should be made extending from the haunch to the shoulder, and the skin should then be raised in such a way as to form a pocket, in which the liquid will collect naturally and where it can be easily taken. As the lymph is contained in the meshes of the connective tissue, it will be necessary to lacerate this tissue with a knife and to expel the liquid therefrom with the hands. Of course the greatest precautions as to cleanliness are necessary.

In compliance with the desire of the Queensland Government we have, while carrying out the above experiments, endeavoured to isolate the Pleuro-pneumonia microbe—if such a thing exists. In no instance have we been able to obtain a "culture" by trying in various mediums lymph collected either from the subcutaneous œdema or from the pleuritic serosity—which, however, at least proved the purity of the lymph which we employed. In four cases, by placing some blood taken direct from the heart in some ordinary beef broth, we were able to cultivate a microbe, which when inoculated into two heifers produced each time a swelling which remained localised. We have not yet been able to satisfy ourselves as to the specification of this swelling.

Before leaving the colony in which we have received such a friendly welcome, we desire to thank the members of the Board, who have always given us such obliging assistance. We also wish to thank Mr. Henry W. Beck for the vigilant care he has taken of the animals under experiment

(Signed) DR. GERMONT.
AD. LOIR.

SOME CONTAGIOUS SKIN DISEASES OF THE HORSE.*

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THE subject for discussion to-day may derive some interest from its comparative freshness, as this is, I believe, the first occasion upon which dermatoid pathology has been brought before the National Association; indeed, it appears, for some extraordinary reason, to have almost escaped the attention of our medical societies for many years.

Of course, relatively with man, skin affections in the horse are comparatively unimportant; yet it will, I think, be readily conceded that in every-day practice skin diseases are of almost constant occurrence, causing in many instances serious inconvenience and loss.

I have ventured to modify somewhat the title of this paper by the addition of the word *some*, as in the present state of our knowledge it is almost an impossibility to attempt an arbitrary division of equine skin diseases by the terms contagious and non-contagious. Again, it is not quite easy, in attempting classification in this subject, to draw a definite line where dermatoid pathology really begins or ends.

To illustrate this difficulty, I may presume that in a strictly limited paper of this kind those contagious diseases having secondary dermic complications only will be excluded. In this division we have such important maladies as Glanders, in the Farcy form, Variola and Stomatis pustulosa contagiosa, which in any exhaustive treatise on skin diseases would naturally demand some attention, although they may be generally dealt with in a study of eruptive fevers of a specific type.

Further, such important diseases in man as Scarlet Fever and Erysipelas will not be included in our subject, as having in the horse no well-recognised contagious properties, although they find a place in veterinary literature under nomenclature which is of necessity misleading.

Tubercular, diphtheritic, and syphilitic skin diseases are not, so far as I am aware, definitely recorded as affecting the horse. The same may be said of the cutaneous form of Anthrax known in man as malignant pustule.

A disease is reported by Mr. R. W. Burke (India) in the VETERINARY JOURNAL, vol. xix., p. 12 (1884), and there designated "Impetigo contagiosa equi," from its supposed resemblance to contagious impetigo of man; and again in the *Veterinarian*, Vol. lix., p. 691 (1886), he refers to his previous paper, and suggests the analogy of this disease with an affection described by two Continental veterinarians (Friedberger and Frohner), under the name of Dermatitis contagiosa pustulosa. It is described by Dieckerhoff also, under the title of Acne contagiosa. Its contagium is believed to be a bacillus. It appears to be closely allied to equine Variola, but unlike that malady, it is a purely local disease.

A skin disease which made its appearance in London stables in 1887-8, possessing apparently contagious properties, was investigated by Professor Axe, who I think described it as a form of Ecthyma.

* A paper prepared for discussion at the National Veterinary Association's Meeting in July, 1889.

I remember assisting him in the inoculation of an old grey pony then in the College, but the experiment was unsuccessful, and I have heard nothing further of the malady.

Our material for study is thus reduced to those pathological changes induced by the occupation of well-defined organisms from the animal and vegetable kingdoms.

Under this section may be included Ringworm, Scabies, and Phthiriasis.

The present time is especially opportune for the study of Ringworm and Phthiriasis, as both affections have (in my experience) been more than usually prevalent during the late autumn and the spring of the present year, and additional interest is awakened in the subject by the large amount of attention this important branch of pathology is now receiving from veterinarians practising in India, where skin diseases appear to be a terrible scourge; and yet, up to the present time, the greatest possible difference of opinion appears to exist as to the cause of the most prevalent and important form. The very interesting paper published in the March number of the VETERINARY JOURNAL by Mr. Haslam has thrown considerable light upon the malady, and also given an impetus to a further study of the subject.

The disease known in Australia as "Queensland Mange" and "Prurigo" is possibly identical with Indian Ringworm; although, from Mr. Stanley's report last year to the Colonial Government, it does not appear that he has demonstrated the existence of a fungus, but is contented with such abstract generalisation as the following: "This 'Prurigo' is distinctly contagious, the medium being *probably* the fungoid parasitic cells or spores. These are so minute that they readily float in the air." Mr. Tyron, of Brisbane, appears to have *discovered* and cultivated a minute fungus in horses affected with the disease.

From a comparative point of view, the clinical history of Ringworm in England and India is of special interest.

Mr. Haslam points out that horses are possibly a frequent source of infection in the production of Dhobie's Itch amongst the natives who attend these animals, and in England Ringworm is not infrequently transmitted from domesticated animals to men in attendance upon cattle and horses, and conveyed by them to their children without the bearer becoming the actual host; as adults seem to possess peculiar immunity from attacks of Trichophyton tonsurans producing the form affecting the scalp (Tinea tonsurans), although many cases are on record of attendants upon diseased horses becoming affected upon the hands and arms (Tinea circinata). I have seen such cases of transmission myself both from horses and cattle.

This may possibly explain the prevalence of Ringworm in rural districts among children at farms, *indirectly* associated with stock, the actual attendants upon the affected animals (more commonly cattle) being the bearers of the spores into the homes without themselves becoming attacked.

Dr. Anderson, in his valuable work on skin diseases, draws special attention to his interest in the transmission of such affections from the higher animals to man, and quotes several cases of Favus (Achorion Schœnleini) conveyed from mice and cats to children; but in only one case is Trichophyton tonsurans indicated as being conveyed from horses to men, quoted as recorded by Bazin at the St. Louis Hospital, where five or six dragoons became affected from grooming diseased horses. That such transmission is of frequent occurrence is within the experience of many veterinarians, although comparatively few cases are considered worth recording.

In the *Veterinarian*, vol. xlv., p. 287 (1872), several interesting cases are recorded by Dr. Fleming, quoting the late Dr. T. Fox.

As probably not one-fifth of the cases of Ringworm occurring amongst the poor in rural districts ever come under the notice of medical men, domesti-

cated animals are but seldom traced as the primary source of infection in outbreaks of this disease attacking children.

The groom in attendance upon a horse became affected on both hands, and his case proved interesting, as on a finger of the left hand the endophyte developed under the nail, and gradually week by week extended almost to the bottom, proving a most intractable case to destroy. A further point was also illustrated, viz., that agents which readily arrested the disease in the horse (which, as will be subsequently shown, was of a very acute form) had no effect in arresting the disease upon the man's hand (which was also of a severe pustular form).

It is, I think, generally accepted that Ringworm in the horse, as encountered in England, and probably India, is due to the epiphyte Trichophyton tonsurans, as there appears to be no authentic case recorded due to the fungus discovered by Schœnlein, *Achorion Schœnleini*, nor to *Microsporon furfur*, producing Tinea versicolor in man.

Much controversy has centred around the identity of these fungi, and when the subject is approached from the physiological side alone there would appear little possible chance of agreement. It is necessary to compare the life history of these epiphytes in the clinical characters of the diseases produced, side by side with their morphology, when there is some definite evidence for agreement.

In order to fully grasp the import of modifications or apparent differences in these diseases met with in horses in this country and in India, it is necessary to follow the life history of fungi generally, and of parasitic fungi in particular.

De Bary, in discussing the vegetation of fungi, says they require in general the conditions necessary to other plant life, such as light, heat, and favourable environment, every vegetative process having certain limits of temperature, high or low; transgression of such limits in either direction leads to rigidity of growth and modification of form, without destroying life. Fungi, owing to their want of chlorophyll, are unable to decompose carbon dioxide, and must obtain their carbon in the form of organic carbon previously formed in other bodies; they can take up nitrogen from ammonia compounds as well as nitrates.

Common moulds *flourish* in nutrient solutions which are more or less acid, but grow less well or not at all in neutral or alkaline fluids.

A process of respiration accompanies that of nutrition in the vegetating fungus cell, a free exhalation of oxygen taking place; consequently, in taking up their food material, they of necessity induce important chemical changes in the tissues in which they develop.

The development of parasitic fungi upon certain animals may depend upon the material composition of the host, and be dependent indirectly upon the nature of its food.

Anatomically, Trichophyton tonsurans corresponds to all parasitic fungi in possessing spores (from $\frac{1}{7000}$ to $\frac{1}{3000}$ inch in diameter, depending upon the soil upon which they develop, *e.g.*, man or horse), and a mycelium or thallus, the relative quantity of the former or latter depending upon the situation in which the fungus is produced; in the hair follicles, where there is a comparative absence of light, the spores are in excess, but in the epithelium the filamentous expansions of the spores (mycelia) sometimes predominate.

Parasitic fungi attack by means of these spores, or by germ tubes emitted by the spores, or by the hyphæ developed from the germ tubes.

The spores emit a germ tube by *taking up moisture* independent of the host, and when the tubes or hyphæ proceeding from them come in contact with the host they fasten upon it.

In the development of dermic epiphytes, the septate mycelial hyphæ divide

transversely into rows or chains of spores capable of germination, resembling those of Oidium lactis.

When these spores are sown in nutrient solutions, the germ tubes which are at once emitted develop only mycelia, producing spores in the manner just described.

According to Grawitz, Achorion, Trichophyton, and Microsporon are *exactly alike*, differing only in size, which difference is attributed by him to differences in food supply; he considers the three forms to belong to one and the same species; also that Oidium lactis is identical, he having induced a mild herpitic skin affection by inoculation with this parasite.

Kobner declares Trichophyton to be identical with the parasite producing sycosis—Microsporon Andonini, and with the fungus of Pityriasis versicolor (Microsporon furfur); this latter fungus has been transferred by him from man to the domesticated animals, and *vice-versa*, by sowing the spores.

Many of the parasitic fungi possess a remarkable tendency to attack young animals of different species, *e.g.*, Oidium albicans, the fungus of Aphthæ, affect the mouth, throat, nostrils, and skin of face of young infants and lambs. Dr. Anderson says T. tonsurans is rarely if ever met with in adults; this parasite rarely attacks cattle *above* the age of eighteen months, but, strangely enough, the opposite obtains in horses, as the disease is generally met with only in working horses, old animals often presenting the most severe form of the disease.

Now for clinical evidence as to the analogy of Trichophyton tonsurans, Achorion Schœnleini, and Microsporon furfur.

Many physicians have supported the opinion of botanists that they are identical, but I know of only two veterinary surgeons who have expressed their opinion as to the identity of Trichophyton and Achorion, viz., Professor Williams and Mr. Macgillivray.

Inoculation experiments have invariably demonstrated the individuality of Trichophyton tonsurans, either in its transmission from man to man or man to animals, or *vice versa*, by the reproduction of the species of fungus inoculated and the lesions characteristic of attack.

Trichophyton has never been known in natural or artificial development to produce Favus or the converse.

Trichophyton tonsurans (in its subdivided forms, Tinea circinata and Tinea tonsurans) is about equally prevalent in the human subject in this country with Favus; the former is exceedingly common in horses, and is frequently transmitted from them to man; the latter is unrecorded as affecting horses.

Practically, clinical evidence is of far more value in dealing with questions of this kind in pathology, as it is quite easy to appreciate the difficulties of microscopical morphology when a comparison is made with schizomycetes, or fission fungi, in artificial cultivation; *e.g.*, the normal and attenuated form of Bacillus anthracis may present identical features under the microscope, yet inoculation with the one would mean death, and the other a step in the process of protection. This toning down process in fission fungi, by deprivation of oxygen or supplying an unsuitable pabulum in which development may take place, is interesting in comparison with the modification produced in Ringworm fungus by its being exposed to an unsuitable host: its life is enfeebled, its development not vigorous—in fact, it is attenuated and incapable of long sustaining an existence, or of inducing any definite reaction or resistance in the host attacked.

The summer of 1888 being excessively wet, many species of fungi were enabled to develop with especial vigour; for instance, Pernospora infestans caused terrible losses in the potato crop, whole fields being attacked within a few weeks.

In my experience, Ringworm in horses has never so nearly approached an

enzootic form as during the late autumn and spring; some cases developed with such exceptional severity that I was led at first to imagine that some new contagious disease had made its appearance.

After careful experimental investigation, I was led to the conclusion that the severe and exceptional symptoms were due to the presence of a fungus developed under circumstances calculated to produce the utmost vigour in parasitic life.

Mr. A. J. Haslam, in his interesting paper before mentioned, remarks that Ringworm (which he has unkindly christened Tinea furfuracea) is "particularly prevalent at *certain seasons* and stations," indicating that heat and moisture have a favourable effect upon the development of the fungus.

The severity and prevalence of this disease in India is probably due to the general climatic conditions of that country being most favourable to the vigorous growth of the fungus, coupled with the general insanitary surroundings of horses as compared with those in England.

Semeiology.—The objective symptoms vary in different patients, depending somewhat upon the development of the fungus and the amount of resistance in the tissues; *e.g.*, there may be only a desquamating circle (varying in size generally from $\frac{5}{8}$ of an inch to $1\frac{1}{2}$ inch), the epithelium being thrown off in bran-like scales without any exudation of serum, the colour of such patches being a whitish grey; the area of the circle is slowly increased in diameter until two or more circles coalesce; when the fungus has invaded and developed in the hair follicles, the affected circle becomes denuded of hair, the exfoliation of the epidermis is continuous, but the alopecia is never so marked as in the acute eczematous type, where the exudation of serum produces a well-marked vesication, which quickly coagulates, forming dense crusts, the hairs standing out almost at right angles with the body.

When the serum first coagulates, there is often a *yellow* tinge to the crust, which, by exposure, is soon darkened, and the grey dust from the skin gives it the well-known grey colour. If the crust is forcibly removed, the exposed surface will be moist and a thin secondary coagulation will take place; under ordinary circumstances the crusts are removed either by washing or grooming, leaving a series of bald circles constituting Alopecia circumscripta.

In the acute or enzootic form of Ringworm which has been prevalent, as before remarked, during the past winter, the disease is generally confined to the hind quarters, chiefly in the region of the tuberosity of the ischium, and extending downwards to the hocks.

In a few cases it may extend to the flank, and perhaps there will be an isolated patch or two on the thorax, but not frequently. It seems remarkable that in cattle the usual seat is the head and neck, but in severe cases it extends all over the body.

In the ordinary squamous form of Ringworm in the horse, any part of the body may be affected. I have noticed many cases on the side of face, shoulders, withers, and back, where the saddle or harness might convey the spores to their resting-place.

It is remarkable how, in the natural extension of the disease, the spores seem to readily become fixed by germination; and yet in artificial inoculation, if the part is not carefully scraped to obtain a slight serosity, the spores will not easily vegetate, and the experiment may become negative.

It will be remembered that spores must obtain moisture, independently of the host, to commence activity, before they can become attached to it, and set up the chemical changes which, with the reaction of the host, constitute the symptoms of the occupation.

After inoculation there is what may be called, with a little elasticity, the

period of incubation; this was pointed out by Mr. Nettleship in his personal experiment of transmission from the calf (*Veterinarian*, vol. xliii., p. 544, 1870).

He lightly scratched his arm, and fixed upon it a portion of fungoid epithelium and hair; it was allowed to remain *in situ* for five days, and then removed and replaced for three days longer, when it was totally removed. No change was noticed in the part until nineteen days after the complete removal of the infective material, except a little occasional itching. On the nineteenth day a small circular reddened patch was noted, slightly raised and roughened, about the size of a split pea; four days later it had extended to about the size of a sixpence, and at the end of another week the circle was as large as a shilling.

In an outbreak during October, 1888, which I will subsequently detail, I inoculated a young mare to satisfy myself that the disease was really Ringworm. The seat of inoculation was immediately under the saddle pad.

The skin was shaved, and a small centre lightly scraped until the serum started; a fresh crust obtained from the horse already mentioned was then put on the denuded surface, and covered by a pad of flannel and the girth buckled over. It was removed after forty-eight hours. The part appeared slightly swollen, but otherwise normal; the pad was replaced and remained on for a week, when it was removed permanently. The experiment was apparently negative, as the original swelling had disappeared, and there seemed to be no active fungus. In a fortnight, however, from the date of inoculation, an eczematous circle appeared about half an inch in diameter, and a crust quickly formed. This remained untouched for about three weeks, when the circle had gained a diameter of one and a half inch.

The mare was *ungroomed* the whole time, and *no other centre* of disease appeared; the fungus was readily destroyed by two applications of ungt. hydrarg. nitrat.

In the outbreak before mentioned, three horses out of five in the stable were affected almost simultaneously, by what was apparently an acute attack of vesicular eczema, the eruption appearing around the tail in a circle of about nine inches from the anus; *the under hairless portion of tail and the bald area around anus and perineum were alike attacked.* The eruption extended down to the hocks and inside the thighs, as far forward as the stifle.

The accompanying *œdema was so intense* that the horse, which was the most severe case, could only be moved with difficulty, the extremities being an enormous size, and the skin in all the affected regions was intensely painful on pressure; but the *actual* eczematous patches, which were all more or less circular, when lightly scratched were evidently extremely itchy, as the animal evinced the usual symptoms of pleasure.

There were no constitutional symptoms, the appetite and excretions being normal.

The remaining animals in the same stable became affected, as did also one of the attendants, as has been mentioned in the early part of the paper.

A subsequent microscopical examination of the decidual hair and scurf confirmed the diagnosis of Ringworm, by the presence of Trichophyton tonsurans.

The unusual features of this outbreak were the *apparent* spontaneity in the three animals attacked, the remarkably acute eczema, and accompanying œdema.

In another ontbreak, where the eruption assumed similar characters, but without the œdema, the affection spread through the stable of seven horses, but much more slowly, as from the time that the first horse was attacked until the last was well nearly ten weeks had elapsed.

Treatment.—Ringworm in the horse in this country is generally eradicated

with comparative ease; this does not appear to be always the case in India. In neither country, however, is there the difficulty in effecting destruction of the epiphyte as is so frequently the case in the human subject in the form of Tinea tonsurans of children. This may possibly be due to anatomical differences in the human scalp and equine integument, or that in human skin the fungus finds its perfect form of pabulum, and can thus better survive exposure to chemical agents. Probably the main difficulty is in reaching the fungus so deeply embedded.

The acute form of the disease, as detailed in the foregoing outbreaks, is much more easily arrested even than the ordinary form accompanied by squamous skin inflammation; indeed, the severity of the reaction in the host almost seems to arrest the progress of the disease. I found that an aqueous solution of plumbi subacetas, two drachms to the pint, freely applied over the whole of the affected surface and entire quarters, not only arrested the eczema, but effectually destroyed the fungus. In only one case was it necessary to have recourse to a more severe remedy, by the ungt. hydrarg. nitratas, which in my experience is the most effectual agent, possibly excepting hydrarg. bichloridum, in destroying Ringworm in any animal.

Almost all salts of mercury seem absolutely fatal to the development of skin epiphytes, or indeed any kind of fungus; as a solution of perchloride of mercury, at a strength of only one in two thousand, will prevent the growth of ordinary fungi in cocaine solutions.

Unguentum is to be preferred to a solution in the treatment of ordinary Ringworm, as it becomes more definitely fixed to the diseased area, and remains in apposition sufficiently long to destroy the fungus. Often one application is sufficient, if carefully rubbed into and *around* the circle, great care being taken to extend the ointment beyond the apparently diseased area, as the fungus is always extending on the margins of the circle. If the ungt. hydrarg. nit. is selected, it should only be applied every other day, or too severe secondary inflammation may be set up; it will not generally be necessary to apply the ointment more than three times. In some obstinate cases, it is a good plan to scrape the diseased surface with a sufficient firmness to remove all the loose epithelium, and then rub on the ointment.

As almost every veterinarian and physician has some chemical agent in which he has more or less confidence in the treatment of this affection, it is unnecessary to press for the use of any special drug.

Salts of mercury, copper, and lead seem to possess special power in destroying the fungus; also liquor ferri perchlor., iodine tincture, acetic acid, carbolic acid and glycerine, one to three; chrysophanic acid ointment has also been much used in human medicine. I notice that Mr. Haslam strongly recommends its use in veterinary practice, but the basis of his recommendation does not seem to be particularly well founded, as he seems to use it alternately with sulphate of copper ointment, which possesses the power of destroying the fungus. Again, Goa powder is made up into a thin paste with acetic acid, which agent will also readily destroy trichophyton; so that under such conditions it is not easy to define which drug really effects the cure.

Much credit, however, is due to Mr. Haslam for his able investigations into the pathology of a disease which has appeared in the past to be a skittle-ground in which Army veterinary surgeons have contended for supremacy in the art of nomenclature.

No definite lines can well be laid down for the treatment of any individual case of Ringworm, as it is better to consider all the special conditions in operation at the time, and the selection of curative agents will be of secondary importance.

The severity of the attack, its period of duration, the part of body affected,

the breed of horse, thickness or sensitiveness of skin, and the general environment of animal will generally guide us in our line of treatment.

During the severe cases under treatment in the past winter, I found it an advantage, in addition to local treatment, to administer, where much subcutaneous œdema existed, salines with small doses of nitrate of potash, followed by a short course of iron and vegetable tonics, or liquor arsenicalis.

Sanitary Measures.—Immediate isolation of the diseased animals if possible, with clothing, brushes, combs, dusters, and harness, should be insisted upon.

All the clothing and other articles which would not suffer damage thereby should be boiled, others disinfected with solution of bichloride of mercury, one to five hundred.

The disease is chiefly extended in a stable by grooming, and I am of opinion that it is better to allow the affected animals to *remain undressed during the time they are under active treatment*, or, at any rate, special care should be taken not to scratch over the parasitic circles, else the spores will be scattered, and many centres of infection on the same horse be established.

Beyond the primary points of attack, the disease rarely extends if this precaution is adopted.

Any woodwork with a sufficiently roughened surface to fix hair or scurf should be washed with boiling water and bichloride of mercury.

It is, I think, an error to conclude that this disease is *only* found in damp insanitary stabling, where horses are badly fed and imperfectly groomed, as in the instance mentioned, where seven horses were affected; these animals were under the most favourable conditions possible as to stabling, diet, and attention, there being four stable-men to attend to the stud, and everything was conducted in perfect order.

The other divisions of our subject, Scabies and Phthiriasis, are due to parasites from the animal kingdom, sub-kingdom Arthropoda, classes Arachnoides and Insecta.

Scabies.—Mange, Scab, or Itch is probably the most ancient and widely distributed contagious skin disease affecting the horse. It appears to exist in almost every country in the world, and has been known to history from the dawn of civilisation; the mites appear in geological history in the Prussian amber, although the *parasitic* nature of the affection was not discovered until the twelfth century, by an Arabian physician.

It would seem to have been regarded as the one skin disease affecting horses in this country for many years; and the impression is by no means entirely shaken off in some quiet corners of the country, where education filters slowly down to those who are in attendance upon animals.

Professor Spooner is recorded to have said that "if the skin diseases were tumbled into a bag they would come out principally Mange."

Sanitation has had a remarkable effect in reducing the prevalence of this affection, as, in general practice, Scabies is by no means the most frequent form of skin disease, although possibly this may be true of *contagious* skin affections.

This will be a special point of interest for discussion, in demonstration of the advantages of veterinary sanitary science.

In man Scabies still appears to be by far the most common dermic condition with which the physician is called upon to deal; as Dr. Anderson, in his analysis of ten thousand cases of skin disease occurring in *hospital* practice, registers the enormous proportion of two thousand five hundred and twenty-seven as Scabies.

Consequently, men and horses appear to be no more fortunate than the most humble forms of animal life in escaping the attacks of this remarkable

family of parasites; as almost every animal, from the common house-fly upwards, has its own besetting acarus, and almost every British bird has its companion "mite," when the latter is sufficiently fortunate to find its host.

Some animals have the unfortunate privilege of acting the part of host to two or three species of acari, the horse being one of the number; indeed, it will be shown subsequently that attempts have been made to establish extra species as parasitic upon this animal, although this will, I think, require confirmation before being generally accepted.

The acari differ anatomically from other arachnids, in the abdomen being unsegmented and not distinctly separated from the cephalo-thorax; the tracheæ or air tubes open on the surface of the body, and internally break up into branches admitting air into the tissues. Each species parasitic upon the horse has its distinguishing anatomy, the male and female being equally differentiated.

Their general conformation will be best understood by consulting the drawings, where the sexes of psoroptes, sarcoptes, and symbiotes are depicted side by side. These drawings, with the exception of sarcoptes, are made from the slides upon the table by Mr. J. D. Roberts, M.R.C.V.S., Aberystwith, to whom I am indebted for the whole of the illustrative material of my paper, excepting the photographs, which were taken by Mr. Biddle, of Dartford, from patients under my care.

The sarcoptes are taken by kind permission from Dr. Fleming's "Sanitary Science and Police," as I have been unable to obtain an original sarcopt in this country.*

In a careful examination it is almost impossible to mistake the species; psoroptes and symbiotes closely resemble each other, but the former are more than three times the size of the latter, the symbiotes being distinguished by the unaided eye with considerable difficulty; this comparison is readily made by holding the slides up to the light.

Under an inch objective the form of psoroptes can be well seen, its pointed head being characteristic (a slide upon the table shows the long pointed mandibles separated); in symbiotes the head is more obtuse, and in sarcoptes it is rounded and very short.

The fore legs of each species are armed with minute hooks, which in psoroptes are the most formidable; they are relatively smaller in symbiotes, and are almost rudimentary in sarcoptes. In Mégnin's drawings, shown by Dr. Fleming ("Sanitary Science and Police," vol. ii., page 412), the symbiotes are represented as having no hooks on the fore legs, the suckers being directly continuous with the terminal pointed segments of limbs. This is not strictly the case, as the suckers in each species are identically placed immediately underneath the hooks, the latter being a direct continuation of and termination to the exoskeleton.

The remarkable power possessed by the creatures over their fore limbs may be well seen if they are mounted alive in glycerine, and examined under a quarter-inch objective.

As is well known, each segment from the body towards the point of the limb becomes smaller, and the mite is enabled to contract the limb telescopically, the sucker being expanded and contracted with beautiful precision, resembling the movements in the trunk of an elephant.

In *sarcoptes* the fore limbs are, in comparison with the two other species, extremely short, but in the hind legs the most remarkable differences are noted. The body of sarcoptes is almost ovoid, and the hind legs are

* Since the above was written, a case of Sarcoptic Scabies has come under my notice, an acarus from which may be seen upon the table, also a photograph of the patient.

attached well under the body; the inner legs being posteriorly placed, and being very short, they cannot be seen when the dorsum surface of the mite is exposed, the situation of limbs being indicated only by the protrusion of a pair of long pointed hairs. Exactly the opposite to this obtains in psoroptes and symbiotes, the hind legs being enormously long, with the following modifications: In the male psoroptes the outer hind legs are very long, and terminate in a small hook and sucker, with a long hair extending backward from the middle of last segment; the inner pair of hind legs are about one-third the length of the outer, and terminate in a fine hair; between the inner pair of hind legs are two abdominal lobes parallel with the generative organs; from each lobe proceed three hairs. In symbiotes these processes or lobes are as long as the inner pair of hind legs, and in place of the two inner hairs a long, spathe-like process extends backwards beyond the outer pair of hind legs, which has suggested the name for this species, Symbiotes spathiferus.

It is quite easy to overlook the spathes altogether, as they are not directly in focus with the hairs and lobes; the inner hind legs have terminal suckers.

In the mature female of psoroptes and symbiotes the hind legs are identical, excepting in size; the inner pair of legs terminate in a sucker, the outer in two long hairs, growing from separate papillæ, the outer of which is longest.

The females are sexually mature when about half grown, and before the inner hind legs are developed; in fact, at copulation they will be found almost rudimentary, the posterior part of the body retaining its rounded larval form. The process of pairing in psoroptes and symbiotes occupies a very considerable time (I have not observed it in sarcoptes); the two valves at either side of the abdominal lobes of the male become inserted over the papillæ at the caudal margin of the young female, the spathes and abdominal lobes being passed over her back.

After copulation the female rapidly develops, the hind part of the body becoming almost square, and her size considerably exceeds that of the male in psoroptes; in symbiotes the mature female is much longer, but about the same breadth as the male.

Each female (sarcoptes) appears to be capable of producing from fifteen to fifty eggs (Hebra, Gerlach, Mégnin), the period from oviposition to maturity being from fourteen to sixteen days.

These observations have been chiefly made in the species Sarcoptes hominis, but probably apply with equal truth to psoroptes, which develop in a few weeks by thousands, and extend steadily over the surface of the body.

The reproduction of symbiotes is a much slower process, and contrary to the conditions generally noted in sarcoptes and psoroptes (where the females are enormously in excess), the sexes seem to exist in about equal numbers.

The habits of the parasites will be briefly considered in treating of semeiology.

An additional species of acarus has been mentioned as attacking the horse, and is described by Mr. R. W. Burke, in the VETERINARY JOURNAL, vol. xv., page 3, as the *cause* of Stomatitis pustulosa acarosa.

He commences the article by saying, "This disease is unknown in veterinary literature;" and on page 4, "These acari I have shown to the other veterinary surgeons in this garrison, having demonstrated them under the microscope; and we are none of us disposed to doubt the identity of these creatures, as being genuine specimens of *either the one or the other of the varieties of the equine acarus.*" The reader, however, may satisfy himself of the truth by study of the sketches appended. This conclusion, which is not highly complimentary to "the other veterinary surgeons in the garrison," is somewhat modified by a note in the *Veterinarian*, vol. lix., page 695, inasmuch

as the acarus which was in 1882 "undoubtedly either the one or the other of the varieties of the equine acarus" has in 1886 become the Acarus farinæ.

Mr. Burke's paragraph is especially definite, as he represents the presence of this acarus diagnostic of a special disease, and it is important that its identity should either be established or disproved. It reads thus: "(7) Stomatitis pustulosa contagiosa acarosa, in which the presence of the *Acarus farinæ* will always determine the diagnosis" (Burke, VETERINARY JOURNAL, 1882).

If Mr. Burke has written anything beyond my quotations respecting this *equine* acarus, I must apologise for my strictures upon his conclusions, which I regard as misleading and erroneous.

A glance at the drawing of Mr. Burke's acarus will show that it has little in common (excepting its *eight* legs) with the *parasitic* acari of the horse; indeed, it appears to have no anatomical convenience for a strictly parasitic life. It is exceedingly unfortunate that Mr. Burke was not successful in finding a complete specimen for illustration, but sufficient of the animal is shown to indicate that it is not identical with Sarcoptes, Psoroptes, or Symbiotes equi, which was Mr. Burke's conclusion in 1882.

Further, its identity with *Acarus farinæ*, which name it received in 1886, is not difficult to disprove, as again the anatomy of the creature is helpful.

A good drawing of the flour mite is shown by Mr. Jabez Hogg, M.R.C.S., F.R.M.S., in his book on the microscope, p. 639. It will be noted that Mr. Burke's acarus is quite distinct from this mite, which has well-marked semi-circular hooks at the end of the legs, and the conformation of the body is altogether different.

As non-parasitic acari (and Mr. Burke's specimen is evidently one of these) abound in vegetable matter, it is not difficult for them to become associated with such a disease as Stomatitis, without in any way being a *cause* of this affection. Mr. Burke says, in concluding his article, that "it is only to those who wait that success will eventually come." It may, therefore, be hoped that he will, on some future occasion, be enabled to establish the life history of his new acarus, and demonstrate, upon some really reliable evidence, that its presence upon the horse is anything more than a coincidence.

The three forms of Scabies which we have to consider are known as Psoroptic and Sarcoptic "Mange," and "Parasitic Grease" or "Parasitic Eczema," each form being due to the reaction of the tissues against the occupation of the acari. In the first and second conditions the lesions are generally diffused, *i.e.*, they may be distributed over the whole surface of integument; while in the latter they are generally confined to the extremities, and frequently still more definitely to the parts below the knees and hocks, the hind legs being first affected.

In all our leading text-books Sarcoptic Scabies is generally assigned the premier place in descriptive articles. It is somewhat difficult to account for this (excepting that such works are modelled upon the basis of Continental writings), as the disease is evidently exceedingly rare in this country. Fleming, in writing of Psoroptic Scabies, says, "In this country I am not aware that any other variety of Mange is usually recognised." Robertson says Sarcoptic Scabies is "rather less common than the other form." With one solitary exception, our clinical records are, so far as I am aware, destitute of any authentic case of Sarcoptic Scabies, the one case being recorded by Mr. C. J. Blenkinsop, in the *Veterinarian*, vol. lvi., p. 171, while a student at the Veterinary College, Camden Town. The case was diagnosed by the late Prof. Robertson "as a probable case of Sarcoptic Mange," and although no acari were found during the life of the animal, the correctness of the diagnosis was demonstrated *post-mortem*, as recorded by Mr. Blenkinsop.

I have in my possession an immature specimen of sarcoptes from this

case, which I received at the time from my lamented friend Prof. Robertson.

Mr. Blenkinsop, at the conclusion of his much-valued article, writes, "This form of Mange seems much more prevalent in London and our larger towns than it is usually considered to be; but from the great difficulty of obtaining the parasites from a living host, one is not always able to recognise it."

I have certainly some reason to doubt the "prevalence" of this form of Mange, in this country, at least, as with the view of illustrating this paper with original drawings, I have applied, with negative results, for a specimen of this acarus to all the veterinary schools in Great Britain, to most of the leading firms in London who sell acari, also to the best-known mounters, and to the professional mounter for the University of Paris. I have also gone through the acari in the catalogue of the Royal Microscopical Society, and strangely enough, the equine varieties are absent in an otherwise important list.

Considerable uncertainty appears to exist in our literature on Scabies, as to the exact form of the disease, and confusion is imported by naming the acari incorrectly. Mr. A. E. Macgillivray, in an interesting article on the destruction of acari, etc. (*Veterinarian*, vol. xlvii., p. 98), writes of certain drugs, "I have used *extensively* for the destruction of the Mange mite (Sarcoptes equi)." This statement would naturally lead one to infer that *Sarcoptic* Mange was, in that gentleman's experience, of common occurrence. It will be interesting to hear from Mr. Macgillivray if such is the case, and if he has been enabled to demonstrate his diagnosis with mounted specimens of the acarus.

Again, he quotes certain drugs as "very beneficial to kill *Sarcoptes hippopodus* or Symbiotes equi."

I quote this latter statement, not with the view to criticise the nomenclature of the writer, but in the hope that some confusion upon the point may be cleared up, as the gentlemen possessing the necessary knowledge to do so are probably present at this meeting.

Prof. Williams, in his work on Scabies, quoting Hering, describes an acarus found in chronic Grease, named Sarcoptes hippopodus, illustrated by a woodcut; and a foot-note indicates that a specimen of that parasite was discovered by Prof. Walley upon the legs of a horse at Leith. He further says, "The presence of *this* parasite in chronic Grease is accidental."

Again, Gerlach is represented as designating *that* epizoön as Symbiotes equi.

The drawing of Symbiotes equi (by Gerlach, a good one of a mature female) on page 651 is the parasite well known to veterinarians in this country by that name; consequently, the creature described by Hering and shown by Prof. Williams on page 633 must be an accidental importation into the subject of Scabies, as a glance at the two drawings will clearly indicate the impossibility of any observer describing them as the same species.

The point I am anxious to clear up is the identity of Hering's Sarcoptes hippopodus! Did Prof. Walley find an acarus identical with the representation of Hering's parasite? If so, it may be taken as established that four distinct species of parasitic acari exist upon the horse in this country.

The presence of acari upon the skin does not in itself constitute disease, but the secondary dermic changes due to their development establish a series of conditions met with in various skin affections, such as pruritus, papular, vesicular, and pustular inflammations, followed by local or general alopecia or by desquamation of the epidermis.

The symptoms of Psoroptic Scabies are intense itching, which is most evident when the animal is quiet in its stable, and its attention not diverted from itself; or during grooming, when the animal leans towards the operator, generally bending the back and extending the neck, elevating the head and curling the upper lip; the process evidently affording the animal extreme pleasure and comfort. This action on the part of the animal is, however, not peculiar to Scabies, as it is frequently noted in Phthiriasis, and occasionally in non-contagious skin affections accompanied by much pruritus.

The itching is not marked until the parasites have been in occupation for some days, when the resistance to their attacks is evidenced by an exudation of serum in the area where they are working; this exudation causes elevation of the hair, and when the serum coagulates the crust or scab fixes the hair in an erect position. When the crusts become firm and dense, the acari quickly extend the circle or migrate to a fresh centre of healthy skin.

They, however, frequently continue to work in an irregular outline from the first point of attack; the crusts may became removed by the constant rubbing and scratching of the animal, and a denuded or raw surface is exposed, sometimes many inches in diameter.

By far the most serious dermic changes are produced by the animal's attacks upon itself, the secondary inflammation caused by the rubbing being more important than the actual mischief done by the mites.

Some writers distinguish between Sarcoptic and Psoroptic Scabies, by describing the lesions of the former as vesicular, and the latter as papular. Fleming ("Sanitary Science," vol. ii., p. 40) says, "Psoriasis therefore characterises Psoroptic Scabies, as eczema characterises Sarcoptic Scabies."

I am not prepared to speak personally of the characteristic lesions of Sarcoptic Scabies, but most distinctly do I deny the absence of eczema in the psoroptic variety; indeed, a well-marked eczema is rarely absent, in my experience.

On the patient shown in photograph No. 5, eczema was peculiarly well marked, each newly invaded area showing, when the hair was turned back, the bright yellow, newly dried serum, identical with acute vesicular eczema. I am fully prepared to admit the existence of psoriasis in chronic "Mange," but I regard this condition as secondary, due either to irritants applied to destroy the acari, or to the resistance of the host to the intruders.

I may again call attention to the photograph above mentioned, as the typical psoriasis of Scabies is there well shown from the withers to the lumbar region, and extending laterally from the spines of vertebræ for seven or eight inches.

This condition was induced by repeated irritants applied by the owner to kill the disease—and the more it was killed the more it seemed to be alive.

This *over-treatment* of Scabies is to be strictly avoided, or squamous inflammations will certainly follow. Much of the integumental induration so frequent in old-standing cases of "Mange" is due to the perpetual daubing on of dressings and ointments when the acari have long since left the neighbourhood for healthy skin. This also is clearly shown in the photograph; fifteen to twenty fresh and isolated centres may be counted below the trace line. Here the acari existed in hundreds; the elevated patch of hair about six inches from the triceps muscle afforded me over fifty parasites, and I probably left many scores; the owner had not applied any dressing to this part of the body.

As psoroptes do not *burrow* like sarcoptes, they constantly migrate, and can always be found on the outer margin of infected areas in the greatest numbers.

Scabies is distinguished from the various forms of eczema and psoriasis by the intense itching, the behaviour of the animal when under examination,

direct evidence of contagion, and the presence of acari, which in the variety psoroptes is easy of demonstration. This evidently is not an easy task in the case of Sarcoptic Mange, for, as I have before stated, none of the eminent veterinarians in this country who have made this disease a special study are in possession of the parasite.

For the symptoms of this form of Scabies I will quote Mr. Blenkinsop's article (*Veterinarian*, vol. lvi., p. 171): "There was a uniform eruption of a vesicular character over the whole of the body, accompanied with great irritability of the skin, which was covered with small scabs. These scabs were more or less adherent to the cuticle, and on their removal moist denuded surfaces remained, in the centre of some of which a minute puncture could be made out with the aid of a lens. The true dermal tissues were in some situations greatly thickened; this was especially noticed over the neck and shoulders, where the skin was thrown into *vertical folds*."

In Symbiotic Scabies, Parasitic Eczema, or "Grease" the lesions are invariably confined to the extremities; the hind legs generally appear to be first attacked; in fact, the disease often exists for many weeks without the fore limbs becoming affected. The itching is intense, and probably the first symptom noticed is the animal stamping vigorously at night, and rubbing the legs in every possible way with the opposite foot or shoe, and at the sides of stall; when the parts are lightly scratched, the animal behaves exactly as in the less localised forms of Scabies.

The acarus invariably commences its attack at the hollow of the heel or about the centre of the pastern, and quickly induces a *marked vesication.*

In one outbreak of this affection, which extended simultaneously to three horses in a stable standing side by side, the vesication was so marked at the heels and posterior parts of the coronet as to appear, upon a cursory examination, like equine Variola; but the itching, and one animal in the stable being affected with "chronic Grease," indicated Scabies, which was demonstrated upon a microscopical examination of the contents of the vesicles.

Crusts generally form on the coronet from the exuded serum, but at the back of the pastern the sebaceous glands become congested, and the characteristic discharge of grease follows. As the acari work up the limb, the area of irritation extends, but so far as my experience goes, vesication is never observed above the fetlock, eczema here being the chief symptom, with denuded patches and hæmorrhagic lines or scratches produced by the vigorous rubbing and scratching, the latter being the cause of the roughened and distorted condition of the hair. The acari rarely travel above the middle third of tibia, although the itching peculiar to Scabies is noted when the animal is lightly scratched on the inside of the thighs; but this is, I believe, simply due to hyperæsthesia.

Symbiotic Scabies is less contagious than either Psoroptic or Sarcoptic, probably because no harness comes in contact with the affected parts, and when an animal gets "itchy legs" the attendants avoid grooming as much as possible, owing to its restlessness.

Sarcoptic Scabies is described by some writers as the most contagious form, owing to the wandering habits of the male acarus. I am very strongly disposed to doubt this statement; certainly any disease more contagious than *ordinary* "Mange" is hard to find; if extension is slow, it is unerringly sure. I have on many occasions known every horse upon a farm to be affected before proper curative and sanitary measures had been adopted.

The natural habits of psoroptes also appear to me to distinctly favour their conveyance from one animal to another, living, as they do, in large groups upon the skin, covered only by crusts of serum, and they quickly wander upon the surface if the host is exposed to warmth, either by harness, clothing, or the sun's rays.

On the contrary, the sarcopt is most difficult to unearth, in spite of scalpel and lens, and lives under the epidermis, in addition to the artificial covering induced by the exudation.

Sarcoptes attacking the domesticated animals do not, according to Dr. Fleming, burrow, forming cuniculi as does the human Itch mite (Sarcoptes hominis). I am not prepared to contradict this statement in its application to the horse, but it is certainly not true of Scabies in the cat; as Dr. Fleming has in his possession a very fine section of the skin of a cat affected with Sarcoptic Scabies, in which, besides free acari, are to be seen cuniculi containing from six to nine ova—if I counted them correctly—in various stages of development. There is one remarkable difference in the burrows—they are at right angles with the surface of the skin, and parallel with the hair follicles; this may also possibly be true of the horse, and account in some measure for the great difficulty in demonstrating the presence of Sarcoptes equi.

As has been pointed out, each animal seems to possess its own special acarus, which confines its attacks to that particular animal with such rigid conservatism that any other species is comparatively safe from its invasion. The one exception appears to be the sarcoptes. The equine variety is recorded as parasitic upon man for a period sufficiently long to induce an artificial Scabies, if such a term may be used (*Veterinarian*, vol. lvi., p. 172).

Mégnin was successful in cultivating Sarcoptes notoedre (cati) upon the horse, and in inducing thereby a veritable Scabies.

The man who was in attendance upon the animal already alluded to became affected upon the hands with an intense irritation and diffused redness, with slight œdema, which caused him great annoyance for several days; he said "his hands felt like a bed of nettles." I made a careful microscopical examination of his skin, but could detect no acari. Was this a case of temporary occupation of psoroptes? Or was it simply a case of hyperæsthesia? the man being of a nervous temperament, and under the impression that he had contracted the disease of the horse.

Treatment.—In the treatment of Scabies, the point to be aimed at is the destruction of the acari if possible, without inducing secondary inflammation, eczema, and psoriasis, which so commonly follow "Mange."

Success is determined possibly more by a thorough application of the remedy chosen, than by superiority of one chemical agent over another.

Mr. Macgillivray, who has a wide experience of Scabies, strongly recommends staphisagriæ pulvis, either in the form of an unguentum or decoction. Professor Williams also recommends this agent in preference to others. Dr. Fleming speaks favourably of this drug, but considers it more expensive than other agents which act equally well; he gives preference to an ointment composed of adeps, sulphur, and potass. bicarb., which is the favourite prescription of M. Mégnin, whose vast knowledge of the subject entitles the ointment to the position of a standard remedy.

Unquestionably, any ointment or dressing having sulphur as a basis may be regarded as satisfactory, if no agents are added possessing severe irritant properties.

I generally use a dressing which has at least one advantage to commend it, viz., that it never fails to destroy the acari; it is composed of ungt. hydrarg. fort., sulphur flav., ol. tereb., and ol. lini; this can either be made into an ointment or dressing, as desired, by regulating the quantity of oil.

In Symbiotic Scabies, where the extremities only require treatment, solutions of liq. plumbi subacet., hydrarg. bichlor. and glycerinum are very useful. But chronic cases require a more stimulating application; a good one being equal parts of ol. picis, ol. tereb., and ol. rapii.

After *isolation* of the affected animals, they should be thoroughly washed

all over with soft soap and water, and when dried the dressing selected should be thoroughly applied *all over the body and extremities, no portion of the skin escaping the dressing.* I am of opinion that Scabies, when once thoroughly established in a stable or upon a farm, is most economically eradicated when the primary dressings are of the most complete character.

I have known Mange to exist for many months in stables where the daubing process only is resorted to—that is, where only the apparently affected parts are dressed, and the remainder of the skin untouched. Under such circumstances secondary outbreaks are constantly occurring.

The dressings should remain upon the animal for four or five days, during which time *no grooming must be allowed;* when a final washing with soda and water and soft soap will effectually remove all trace of oil, etc., and the skin will quickly resume its healthy appearance.

(*To be continued.*)

THE HORSE IN CHINA.*

THE shaggy, unkempt, gaily-caparisoned Mongolian Rosinante, provided with a necklet of bells, such as we see it daily in the suite of a mandarin, or in the service of the pig-tailed cavalry, is certainly an object that might excite our admiration. Compared with its Arabian, and even European kindred, the Mongolian steed occupies a very subordinate position; and, considering the circumstance that the Chinaman appears to bestow so little care on the animal, one might also be justified in believing that it stands exceedingly low in the national esteem. Such, however, is not the case, for horse-breeding has enjoyed particular care and attention in the Middle Kingdom.

The most ancient documents which the history of China has to shew, refer to the horse as regards its use in war, in the chase, and in agriculture. In the Chou Dynasty horses were the object of special legislation, and were divided into the following six classes: horses set apart for the Emperor and nobility; those used for warfare; those used for draught and agriculture; those used for forwarding government despatches; those for the use of private persons; and beasts of burden. To the Emperor alone no less than 40,000 war horses were assigned, and the princes and nobility were also entrusted with an important number of these animals. The art of riding was very much cultivated at this time; to no man was it permitted to become a horse soldier before his thirty-fifth year, or to remain one later than his fiftieth. He had to be big, robust, and strong; active, and firm in his saddle. "The good rider," it is written in a book of the period, "must be grown together with his horse, as the bark with the tree; besides which, the swiftness of lightning, the immovability of a rock, and the lightness of a feather must characterize him." As long as this warlike spirit was maintained among the people, and the simple hardy life was regarded as the most honourable, China had also a fiery race of horses to show. As soon, however, as the country sank into sloth and voluptuousness, and in the interior of the kingdom disturbances broke out, the breed also decayed. The ease in which the horses were reared and the circumstances that prodigious numbers of them were allotted to the Imperial stables, had as a direct consequence the degeneration of the animals, and thence a great mortality among them. The injury that was effected during the Han dynasty was so great that when the first Emperor of the T'ang dynasty mounted the throne, it was found that the whole cavalry of China counted only 5,000 horses. At his death, however, he left to his successor not less than 700,000 horses for selection in the different provinces of his kingdom. It is even said that the number had so much increased a short time after that, that horses were actually more

* Translated from *Der Ostasiatische Lloyd.*

numerous than camels, sheep, and oxen. This state of things, however, did not last long, and the country relapsed again into corruption of morals. The department to which the inspection of the government stables was entrusted became negligent, epizoöties broke out among the animals, and when towards the end of the 13th century the Sung dynasty was overthrown by the Mongolian hordes, it became evident that it was quite impossible to oppose them by an adequate force of cavalry.

It was principally the Mongolian horses through which China was conquered, but the damp atmosphere did not agree with them, and the corruption among the native inspectors was so great that when the Yuen dynasty again was expelled, they could not raise a sufficient number of horses on which they could make their escape. These were altogether the most important fluctuations which hitherto had characterized horse-breeding in China, and it should not be without interest in connection with the subject to consider the theories which are current among the Chinese with regard to the proper treatment of the animal. All horse stables should face the south; moreover, a horse should never be reared in the neighbourhood of silk-worms. The belief is even common among the Chinese that one only need rub the teeth of a horse with the refuse of a silkworm in order to prevent it from chewing its food; in fact, a few mulberry leaves put into the mouth of a horse are sufficient to take away his appetite for ever. The pig-tailed naturalist declares that the insignificant size of the ears of a horse proves a correspondingly small liver; moreover, the size of his nostrils corresponds with that of his lungs, and are, besides, a safe sign of the endurance which an animal will develop in a race; the size of its eyes corresponds to that of its heart—thereby a sign of the courage of the animal. A horse hates galloping when it has the wind at its back; but the exercise is pleasant to it when the wind blows in its face. When a horse rolls on the ground, and makes no preparations to get up again, it is a safe sign that its bones are hurt; when, on the other hand, it does not shake the dust off after having risen, something is the matter with its skin; but if while shaking the dust off the animal ceases to snort through its nostrils, it has a pain in its chest. If a horse becomes ill, then something is usually wrong with heart, stomach, lungs, kidneys, or liver. If the animal has heart-disease, the tongue becomes bright red; with a stomach-ache its lips fade in colour, etc. The average life-time of a horse is thirty-one years—half the age of a man, and twice that of an ox. The fact that many horses die before their thirty-first year shows that they have not been properly treated. In order to extend its life to a natural length, three things are necessary, namely, a horse should never be transported from its home country to a foreign land. The Tartar horses, they say, pine away when taken to the warm damp provinces of the south, being accustomed to the fresh air of the western deserts and the hard life there; and the enervating climate and richer food result in early death. That this is something more than empty air is shown by this, that when the conquered Tartars of the T'ang dynasty had to pay their tribute in horses, not only was it impossible to keep the horses alive for long, but they also brought a contagious horse disease into the country. Secondly, the horse should be left entire. And thirdly, a horse should never be used for other work than that to which he was originally trained. The hired horse should never be changed into a beast of burden, nor the hack into a draught horse. If this is done, the animal (so affirms the pig-tailed veterinary surgeon) must shortly die.

That these rules, at least by far the larger part of them, rest purely in the imagination, is proved by the hundreds of Mongolian horses which yearly are taken to Shanghai. The race-course of that place, on which, during a recent week, the spring races took place, has had numberless horses to exhibit that

have gone against all the rules just quoted, without the procedure having bad consequences. On the contrary, nothing should afford to the Chinese horse-trainer a more striking proof of the absurdity of his creed than the magnificent specimens of Mongolian race-horses which have once more just brought to light to what a high standard of perfection the art of the European horse-trainer can bring the Mongolian Rosinante, highly unpromising and insignificant as its original condition was.

THE PHYSICAL CONDITION OF HORSES FOR MILITARY PURPOSES.

BY GEORGE FLEMING, ESQ., C.B., LL.D., F.R.C.V.S., PRINCIPAL VETERINARY SURGEON OF THE ARMY.

(*Continued from page* 46.)

Three-year-old remounts at the Remount Depots receive:—

Oats 6 lbs. 9 ozs.
Hay 10 lbs. 15 ozs.
Straw 13 lbs. 2 ozs.

For three or four months of the year they are put on green food, but the transition to and from this is gradual.

In the French Army there is a similar gradation in the scale of forage ration, according to the arm of the service and the kind of work performed. The Light Cavalry (Infantry officers' horses are included in this category) allowance per horse per diem is—oats about $8\frac{3}{4}$ lbs., hay $8\frac{3}{4}$ lbs., straw $5\frac{3}{4}$ lbs. in garrison; on the march it is 10 lbs. oats, with the same quantity of hay and straw as in garrison; at manœuvres, if the horses are in barracks they receive the same ration of oats as in garrison, with $6\frac{3}{4}$ lbs. hay and about 9 lbs. straw, but if in bivouac then the ration is the same as for the march; while on a war footing it is $10\frac{3}{4}$ lbs. oats, $6\frac{3}{4}$ lbs. hay, and $4\frac{3}{4}$ lbs. straw. The line Cavalry (the horses of Engineer and Infantry officers are on this scale) receive in garrison 10 lbs. oats, $6\frac{3}{4}$ lbs. hay, and 9 lbs. straw; on the march $11\frac{3}{4}$ lbs. oats, and 11 lbs. hay and straw; at manœuvres, if in barracks the ration is the same as in garrison, if in bivouac it is as on the line of march; while on a war footing it is nearly 11 lbs. oats, 9 lbs. hay, and $4\frac{1}{2}$ lbs. straw. The reserve Cavalry includes the horses of the Staff, Intendance, Staff of Artillery, and of Engineers and Auxiliary Transport. The ration in garrison is—oats $11\frac{1}{4}$ lbs., hay 9 lbs., straw 9 lbs.; on the march it is—oats 12 lbs., hay and straw 11 lbs.; on manœuvres, if in barracks it is the same as in garrison, and if in bivouac the same as on the march; on a war footing the allowance of oats is 13 lbs., hay 9 lbs., straw $4\frac{1}{2}$ lbs. For Artillery horses —draught and saddle—the garrison ration is $10\frac{3}{4}$ lbs. oats, hay 9 lbs., straw 9 lbs.; on the march it is 12 lbs. oats, 11 lbs. hay, and the same of straw; on manœuvres, if in barracks it is the same as in garrison, if in bivouac the march allowance is given; the war ration is nearly 13 lbs. oats, 9 lbs. hay, $4\frac{1}{2}$ lbs. straw.

In the Russian Army the daily ration during peace is as follows:—

Guard Cavalry and Artillery, 12 lbs. $7\frac{5}{10}$ ozs. oats, 9 lbs. 1 oz. hay, 3 lbs. 10 ozs. straw.

Line Cavalry, Artillery, and Engineers, 9 lbs. $5\frac{1}{2}$ ozs. oats, and the same hay and straw as above.

Transport Draught, 7 lbs. $12\frac{1}{10}$ ozs. oats, 18 lbs. 2 ozs. hay.

In the regiments and batteries of the Guard, this allowance is given all the year round, but in other corps it is only issued for eleven months, the horses being turned out to grass, and only receive 13 lbs. $9\frac{1}{2}$ ozs. of hay for one month after the manœuvres.

If necessary, barley may be substituted for oats, weight for weight, and hay can replace oats in the proportion of 4 lbs. 8½ ozs. of hay for 3 lbs. 1½ ozs. oats. In war, the above rations are issued, with the addition of 3 lbs. 10 ozs. of oats; and in lieu of straw 4 lbs. 8½ ozs. of hay are issued. Thus the forage ration of a Line Cavalry Regiment during war is 12 lbs. 15½ ozs. of oats, and 13 lbs. 9½ ozs. of hay.

From this statement you will see that in the great armies of the Continent, close attention has been paid to the quantity of forage required in each arm of the service, to ensure physical fitness in peace and in war; and you will also gather that in our army this subject has evidently not received the notice it deserves. Our horses are either underfed while they are performing hard work, or they are overfed when this is light; and if the ration is sufficient for large horses, it must be more than sufficient for small ones. I am certainly of opinion that the whole subject of forage for our troop horses needs investigation; and in view of the fact that the allowance is not properly apportioned between light and heavy horses, or with reference to the work done, and that it is generally inferior to that of other European armies, especially that of Germany, I think the time has arrived when this inquiry should be made. In this inquiry the quality of the forage should not be overlooked; the present contract weight of oats is too low and should be altered.

3. Care and Management.

With respect to care and management, I need not say much to you, except to state that in direct proportion as these are attended to, so will the physical fitness of horses be ensured. They comprehend so many details, that it is impossible to deal with them in a brief lecture. Grooming, feeding, shoeing, housing, equipping, working, and all the other points comprised in these terms, are of great moment, and need constant attention in order to their being carried out to the advantage of the horses. Given good horses of the proper kind, and food sufficient in quantity and good in quality, their welfare then depends upon those who attend upon them. Only one thing I would like to refer to before leaving this section, and that is the necessity for inculcating kindness in all who have to do with horses. Physical fitness is closely related to mental fitness; for that horses have minds, affections, and memories no one can deny, and all who have studied them will bear testimony to the effects of ill-treatment and kindness upon them, not only in the performance of their work, but upon their durability. Horses kindly treated will do as much, if not more, service in a given space of time than those which are harshly used; while they will certainly last very much longer. With unfeeling treatment and bad management, horses can be worn out in a very short period; whereas, under the opposite conditions, their lives might be most usefully prolonged to more than twenty years.

Therefore it is that, in order to assist in ensuring the physical fitness of their troopers, soldiers should be continually reminded of the great importance of kindness to their animal friends and companions. Humanity to animals is a sacred duty imposed upon all of us; to the soldier it is this and something more, for his life may depend upon the reciprocal feeling of affection existing between himself and his steed. In the words of the old Cavalry soldier already quoted, "The rider must live only for his horse, which is his legs, his safety, his honour, and his reward." Soldiers should never be deprived of their horses, if possible, if they have taken care of them; but they ought to be encouraged to form a friendship with them, or even to imagine a kind of proprietorship in them. Officers and men should learn as much as they can of the care and management needed to keep their horses in the best condition for work, and how to preserve them from injury.

4. Amount of Work Exacted.

The amount of work which can be safely exacted from horses depends so much upon the points I have already specified, that nothing definite can be said with regard to it. Army horses are more exposed to extremes of toil than other horses, and during active operations hardship is usually added to fatigue—hunger and thirst, exposure to inclement weather, and often more or less serious injuries being superadded. It is under these conditions that the physical fitness of horses is most seriously put to the test; and well it is if this enables them to undergo them without breaking down, or becoming seriously impaired in efficiency at a perilous crisis. It only too often happens that there is no choice during war operations between moderate, heavy, and excessive work, and therefore no rules can be laid down which might be made applicable. What is comparatively easy work for horses in good condition, during favourable weather, and in a country well adapted for movement, would be the opposite for weak horses in an inclement season, and in a heavy country.

5. The Manner in which the Work is Exacted.

Of course, everything should be done to guard against physical unfitness, no matter how severe the duty may be; and it is here that the skill and attention of officers and men are perhaps rendered most conspicuous and beneficial. In performing exactly the same amount of work under the same conditions, one regiment or battery will have its horses in a good state during the whole time, while another will be nearly broken down. This will greatly, if not altogether, depend upon the manner in which the work is exacted, and the amount of care taken of the horses. It is well known that there are horsemen who will get more work out of their horses, and at less expense to them, than others; and that a horse which, with judicious management, will perform a journey of many miles, can be exhausted in a few miles by unwisely urging him. It is not always the amount of work, but the manner in which it is performed, that does the damage.

Therefore it is that, in order to keep horses physically fit for their work, the utmost vigilance, knowledge, and forethought are imperatively necessary on the part of those who are responsible; and the task is not a light one in the field. At no time was it an easy one, and during active operations in the future it is to be apprehended that it will be more onerous than ever it was; it will certainly be no less exacting than it was during the Continental wars in the early part of this century, when a Light Cavalry General enumerated, among other requirements of a good Cavalry Officer, "readiness in judging of the state of health of men and horses; a knowledge of prompt remedies applicable in certain cases; a daily and careful inspection of the saddlery, and detection of the repairs required in it; provision of everything which may be useful to man and horse, without over-weighting the latter; inspection of the equipment and of the repairs required in it; intelligent packing of kit; regularity of pace on the march; good choice of ground for camping, and continuous supervision of everything which may affect the health of the horse there; the teaching of the means by which the services of a farrier may be dispensed with for the time being; . . . watchfulness to prevent useless expenditure of the strength of his horses; to give in all circumstances a personal example, and to give it all the more steadfastly as the situations are more trying and difficult."

For horses which have to move quickly over broken ground, and perhaps at the end of a long march, the greatest consideration is required to keep them ready for all emergencies; and it is to these horses that the foregoing remarks more especially apply. While the greatest attention is being paid to render the fire of Artillery and Infantry more rapid and deadly,

and more extended, are we taking as much care to improve the mobility, the celerity of our Cavalry in proportion, so as to place it on a more equal footing with these now formidable arms? I fear the answer must be in the negative; for while our horses have certainly not improved in quality, as Cavalry horses, from what they were half a century ago, when fire-arms of precision were not known, the loads carried by these horses have not been much, if anything, lessened. Not only have the arms of precision rendered it necessary that physical fitness in endurance and speed should be more than ever considered in our quick moving horses; but the electric telegraph, telephone, and visual signalling have all concurred in demanding greater rapidity of movement from them, if Cavalry is to be a potent factor in warfare. In connection with this point, the question of the weight carried by Cavalry horses is of the most vital importance. There can be no doubt whatever, that for the work which Cavalry should do effectively in the field, the loads they carry are far too great. So far as I can learn, the estimated weight that a Light Cavalry horse should carry is more than 19 stone, allowing the rider to weigh 10 stone; in Heavy Cavalry, the soldier weighing 12 stone, the horse carries more than 21 stone, and this without even a day's forage, which will add at least another stone; and if the weather be wet, saturation will impose yet another stone or two more. Celerity under such enormous loads is impossible; and when to these we have bad weather and scanty or bad forage, with long marches, it is evident that the destruction of the best horses is a matter of a few days; exhaustion must be rapid, and sore backs and crippled limbs inevitable.

There would appear to be a tendency to heap weight on horses' backs, even in mounted corps with carriages, as in the Artillery and Transport.

In the Cavalry, the soldier carries on him 28 lbs. 3¼ ozs.; the horse equipment 74 lbs. 3½ ozs.; in wallets 6 lbs. 14¾ ozs.; in front of saddle 8 lbs. 1¾ ozs.; behind saddle 12 lbs. 13½ ozs.

In the Royal Horse Artillery, the soldier carries 28 lbs. 7½ ozs.; the horse (including harness) 98 lbs. 14½ ozs.; in wallets 8 lbs. 3¾ ozs.; in front of saddle 8 lbs. 1¾ ozs.

In Slow Draught Corps (Royal Artillery, Royal Engineers, and Army Service Corps), articles on driver weigh 18 lbs. 8 ozs.; harness complete 80 lbs. 8 ozs.; articles on saddle 26 lbs. 8 ozs.; articles in wallets 4 lbs. 8 ozs.

So that in the Royal Horse Artillery the near side horse carries 144 lbs., which, with the weight of the driver (12 stone), amounts to 22 stone, while in a field battery it is 21 stone; and these horses have to draw from 8 to 10 cwt. besides!

These terrible loads could surely be reduced, even if we must consider them as minimum—for it must be remembered there are many men in Cavalry who weigh much more than 12 stone. I have seen men in Light Cavalry who, in stable dress, weighed 16 and 17 stone. It does seem strange indeed, that in corps such as Artillery and Transport, the greater part of the killing load should not be transferred from the horses' backs to the waggons. An ounce on wheels is a pound on the saddle.

And surely the Cavalry loads can be lightened considerably. Is it absolutely necessary that all the articles enumerated in the equipment list be carried on the saddle?

Wheel or pack saddle carriage should be employed to convey everything but what is vitally necessary for man and horse. It is astonishing how little is needed, if men are trained to require little. De Brack, who should have known what was necessary, says, "A valise for Light Cavalry which can hold more than a couple of shirts, a holdall, and under its flap a pair of boots, is not only useless, but really a danger. The fewer articles a soldier has, the greater care he takes of them, the cleaner he is, and the more ready, too.

The Chasseurs of the Imperial Guard went through the whole of the Russian Campaign before my eyes, with a pelisse and a single pair of cloth Hungarian pantaloons." And he adds, "The art of carrying kit lies in three things—1st, to take only what is indispensable; 2nd, to distribute the weight equally, fatiguing the horse as little as possible, and not chafing him; 3rd, to afford the rider the greatest possible facility in managing his horse, and to derive the greatest advantage from its powers. The art of packing is three-fourths of the duties of a Cavalry soldier in the field."

The work of a Cavalry horse is more like that of a hunter than any other description of horse; and we know what a hunter can do, and how he must be treated in order to keep him physically fit. We also know something as to the price of a hunter able to carry 18 stone safely, and if he does two days' hunting in seven, it is usually considered enough; in the meantime, he receives such treatment in the way of housing, feeding, grooming, and other attentions, as the poor troop horse never knows at any time.

It is urgently required that the loads on army horses' backs be diminished to the very lowest possible weight. At no time should it exceed 18 stone, even with the best horses this country can produce; and that army which can muster a lightly equipped Cavalry will certainly have a great advantage over one whose horses are heavier laden.

How reduction of weight is to be effected it is scarcely in my province to say, though I might urge that on the saddle and on the soldier little more should be carried than what is needed for actual conflict, and these articles should be of the very best. Everything else necessary should be carried on wheels or pack saddle.

It may be interesting to glance at the weights carried by Cavalry horses in the armies of other countries, and compare them with those of our own.

France.

According to the Aide Mèmoire of the Staff (edition 1888), the following are the average weights, including the weight of the rider:—

Light Cavalry	19 stone 1 lb.
Dragoons	20 „ 2 „
Cuirassiers	23 „ 10 „

It is added that these weights are increased by 1 stone 8 lbs. after exposure to rain.

A more recent article* in the "Revue de Cavalerie" (May, 1881), gives the following as the result of official trials in several regiments:—

Light Cavalry	17 stone 11 lbs.
Dragoons	18 „ 10 „
Cuirassiers	21 „ 6 „

These weights were made up as follows:—

	Average weight of man.	Average weight of saddlery, etc.
Light Cavalry	9 stone 6 lbs.	8 stone 5 lbs.
Dragoons	10 „ 1 „	8 „ 9 „
Cuirassiers	11 „ 9 „	9 „ 11 „

I may incidentally mention that the French Light Cavalry horses towards the earlier part of this century carried 112 to 115 kilogrammes, equal to 249 to 254 lbs., or 17 stone 11 lbs. to 18 stone 2 lbs.; being an average of 17 stone 12 lbs.

* Entitled "Trop Lourd."

ITALY.

Colonel Slade* gave the following as the weight of Italian Cavalrymen with arms and accoutrements (forage not included):—

Hussars	16 stone 8 lbs.
Lancers	17 „ 4 „

This month he forwarded the following additional information:—

Light Cavalry.

Average weight of man	10 stone	5½ lbs.
„ „ saddle complete	4 „	6½ „
„ „ carbine and sword		13 „
	15 „	11 „

Lancers.

Weight of man	11 stone	4½ lbs.
„ saddle complete	4 „	6½ „
„ sword, lance, and carbine	1 „	3½ „
	17 „	0½ „

In addition to the above the horse carries 12 lbs. of hay and 8 lbs. of corn.

Colonel Slade adds that the weights given in his report, No. 51, were taken from personal observations, as he had six men of each branch of the Cavalry weighed, and struck an average. They differed a little from the above, which he got from the War Office, and on one point in particular he disagreed, viz., the difference between the individual weight of a Light Cavalryman and a Lancer, as there is certainly not more than 7 lbs., whereas they show it to be 13 lbs.

BELGIUM.

Particulars of the new light saddle and equipment adopted for the Belgian Cavalry will be found in War Office paper $\frac{0}{3}\frac{1}{0}\frac{4}{8}\frac{0}{0}$ with enclosures.

This saddle, designed by General Courtin, when fully equipped for the field weighs:—

3 stone 1 lb.

The weight of corn for the horse and the rider's rations are included.

GERMANY.

Cuirassier's horse (marching order) carries	23 stone	0·388 lbs.
Man, average	13 stone	5 lbs.
Saddlery and kit	6 „	6·002 „
Clothing and arms	3 „	3·386 „
Hussar's horse (marching order) carries	18 stone	5·554 lbs.
Man	10 stone	3 lbs.
Saddlery and kit	6 „	7·630 „
Clothing and arms	1 „	1·8924 „

NETHERLANDS.

Cavalry horse (marching order) carries	17 stone	12·8 lbs.
Man	10 stone	3 lbs.
Saddlery and kit	5 „	4·8 „
Clothing and arms	2 „	5 „

* In despatch No. 51 of 1888.

SWITZERLAND.

Cavalry horse (marching order) carries 17 stone 5·66 lbs.

Man	10 stone	3 lbs.
Saddlery and kit	5 „	0·05 „
Clothing and arms	2 „	2·61 „

SWEDEN.

Cavalry horse (marching order) carries 19 stone 8.17 lbs.

Man (say)	10 stone	3 lbs.
Saddlery and kit Clothing and arms }	9 „	5·17 „

RUSSIA.

The average weight carried by the Cavalry horse is 18 to 20 stone, as follows:—

Saddlery complete with valise and great coat	83½ lbs.
Clothing and boots	8 „
Linen	1¾ „
Carbine, bayonet, and cartridge pouch	11 „
40 rounds ammunition	3½ „
Weight of man	144½ to 180½ „

AUSTRIA.

Service Marching Order.

Dragoons Uhlans }	21 stone 3 lbs.
Hussars	20 „ 13 „

The weight of the rider is in each case taken at 11 stone.

I have now concluded my observations on the physical condition or fitness of army horses, but feel that I can have done the subject only scant justice. It is far too extensive for one lecture, but, nevertheless, I trust what I have ventured to bring before you relating to it may be amplified by the remarks of those of you who are in a better position to deal with it than I can pretend to do.

DISCUSSION.

The Chairman: There are several points I should like to touch upon in starting a discussion on this excellent lecture. First, I wish to ask whether the price of army horses has increased within the last fifty years. We know that the last half century has seen enormous changes in everything—railways, for instance, have made very great changes in the habits of the people. Farmers and others, who formerly used horses very much, now go themselves and send their produce by rail, and it stands to reason that this fact alone must have an effect on the breeding of horses. Race horses and hunters have also changed. Things are now faster, and people are in a much greater hurry than they were, and we expect more speed from our horses. I should like to know what effect these changes have had on the prices and quality of horses. The question of care and feeding is another subject that might be discussed. It would be interesting to know how many Cavalry horses are "cast," and how long they last. We have often heard of horses lasting twenty years, and a great many of us may have had horses useful for that time. How long do they last in a Cavalry regiment? What quantity are cast every year, and is the number increasing or not? As regards the change or variation in the ration I should think that would not be a very easy thing to arrange, and the experience of Cavalry officers would help us. It is a matter of importance, because in some stables certain horses eat more than

others, and some are much better if they do not have so much. Mr. Fleming told us that in foreign armies this variation existed, and from the experience of our friends who have been abroad, I should like to ask whether their horses are better than ours—whether reducing the scale has had a good effect on that point I am very doubtful. I was extremely pleased to hear Mr. Fleming speak of the importance of the mobility of Cavalry, because I believe the whole of our thoughts ought to be centred on this point. Cavalry reconnaisance has become far more extended on account of the range of guns and rifles having increased, and therefore there is more than ever necessity for great mobility. In connection with rapidity of movement comes the question of weight. On the subject of weight I wish to ask how much at present concerns the man and how much the horse. As regards the man I am quite certain that the amount carried for his comfort might be reduced. It would be a great advantage to us if our Cavalry horses could carry three or four stone less than at present. I have made these few remarks rather with a view of starting a discussion than giving an opinion of my own.

Colonel Maclean, 1st Dragoons: In speaking of the food of horses Mr. Fleming did not touch on water. Do you not think that good water is a very essential thing? I know that the reason horses do better in some places than in others greatly depends upon the water. Another thing, I think our horses are much too crowded; there are too many horses in one stable, and I think they ought to be fed four or five times a day instead of three. By feeding them at long intervals they are induced to "bolt" their corn, and perhaps one is a more savage feeder than another, and gets part of his neighbour's allowance. I have often seen a horse eat his neighbour's corn before his own, and I think a division might be put between their mangers with advantage. By feeding them more often the corn is properly digested, and it is generally more conducive to good health. I have known sick horses by tempting them with a little bit now and a little bit again look quite different in a month. I also think every Cavalry barracks should be provided with a good horse-power corn-crusher. A great part of the corn is passed by the horses without being masticated at all. They gave us chaff-cutters, and they might give us corn-crushers. I use bruised oats in my private stable always, and find them a great benefit. As to the weight our horses carry, I am of the lecturer's opinion that we ought to get as much as possible off his back and put it on wheels. I am quite certain the amount that horses have to carry is far too much, and I think it might be reduced about two stone. I think the horse is asked to do more than he possibly can.

Lieutenant-General Sir Evelyn Wood: I think in connection with the crushing of corn arises the question of the horses' teeth lasting.

Colonel Morton, Army Remount Department: General Ravenhill asked me to represent the Army Remount Department, and I regret very much that he is not here himself, as he could have answered the question whether the Cavalry horse has or has not deteriorated. I am afraid from my experience I cannot speak practically, but I think it has. When this lecture reaches him, which I have no doubt it will shortly, he will have his views put on paper. He is much interested in the Government commission, and all the steps that are being taken for the improvement of the breed of horses there have not had time yet to show fruit, but will do so in some five or six years, and attention has undoubtedly been turned to the breeding of light-legged horses available for military purposes. There are two things I should like to refer to. First, with regard to the corn-crusher, one objection to it is that you cannot have it on service, at all events. There would certainly be no time then to be crushing oats, to say nothing of carrying corn-crushers, and I think it very materially answers the argument. With regard to the effect of water upon horses, there is no doubt that at some stations horses look far better

than at others owing to different water. As to the weight carried now by Cavalry, I am not able to say what the effect is on service, but in time of peace every one seems trying to load the horses more and more, and a great many fads have had the effect of considerably increasing the weight, but directly men get on service a great part of these are thrown aside. There cannot be the smallest doubt that every effort should be made to decrease the weight at present carried on our Cavalry horses' backs.

Colonel Maclean: I do not see why the horse should not have his corn crushed in time of peace, at any rate. We do many things in time of peace that we do not do in war. (Hear, hear.)

Lieutenant-Colonel R. Athorpe, R.E.: We have some alternative rations on which to feed our troop horses in the Army by which we can vary their feed—grass, carrots, etc., for instance, when they can be got, so that they are not restricted to a hard-and-fast diet of hay and corn. In his comparison with foreign nations the lecturer very properly remarked upon the increased ration for larger and harder-worked horses. When you get horses of a certain size you must put enough into them, or they will not do the work you require of them.

Lieutenant-General Sir Evelyn Wood: Have we been adding much to the weight since the Crimea?

Colonel J. N. Crealock: I think it is about the same.

Lieutenant H. L. Webb, Quartermaster, 1st Dragoons: It is heavier than it was in 1858. We have more ammunition than in former times, and signalling instruments, pioneer equipment, picketing gear, breast harness, etc., to carry, which we did not have before.

Sir Evelyn Wood: But those things only affect some three or four per cent. of horses, and do not affect the general question.

Lieutenant H. L. Webb: Nevertheless the Cavalryman is more generally weighted. His necessaries and clothing have not been reduced, but rather increased, and some articles are heavier; for instance, his Wellington boots were used for riding, now the Cavalry soldier has a pair of knee boots in addition, which weigh 6½lb.

Sir Evelyn Wood: I quite admit the pioneer tools affect a few horses, but, on the whole, we have been taking off weight generally.

Inspecting Veterinary-Surgeon W. B. Walters: I think that one of the principal causes of deterioration in the quality of our Army horses may, in a great measure, be attributed to the presence of foreign buyers in our markets. I know, from personal experience, that under the old regimental system of purchasing it was frequently a matter of great difficulty to procure young horses of the right stamp in sufficient numbers, owing to the fact that at every important fair in Ireland agents were actively employed in buying for Continental armies the very animals that we required for our own, and at prices considerably above our limit. This will probably explain the reason why a better class of Cavalry remounts could be bought thirty years ago for £25 than can now be purchased for £40. As regards the question of oat crushing, I am certainly in favour of it, and consider ten pounds of crushed oats to be nearly equal, in feeding quality, to twelve pounds of whole oats. Of course, it may not always be possible to supply crushed grain; for instance, on active service in the field. Yet I see no reason why it should not be issued on all practicable occasions. We ought to neglect nothing in order to keep our horses in the highest degree of health and vigour, and to prepare them for any emergency that may arise. We may be sure that if we had our animals in an enemy's country in good hard condition, they will go through a campaign very much better than if landed in a state of comparative poverty. (Applause.)

Major W. G. Knox, R.H.A.: I quite agree with what Colonel Maclean says

about the horses being cramped and crowded in stables. I have one troop stable with fifty-eight stalls in it, and have to put fifty-eight horses in it. This handicaps stable management, as there is no room to humour "tricky" horses. Warmth is another thing that should be attended to, and doors and windows made to fit a little better; but, perhaps, this is an Engineer's question. As to the deterioration of horses for army service, I think it is only a question of price. I believe the horses exist, and I remember in 1878, when we were raised to war strength, and the price raised £10, we never were better horsed in the Horse Artillery. I think the question of not buying docked horses cramps our military market very much. For draught purposes a docked horse is much preferable, as we all know. The lecturer is not quite correct in his figures regarding the weight of a driver in the R.H.A., nor in the weight behind the team. Few drivers stripped weigh more than 10 stone, and the weight behind the team is now 7 cwt. per horse, which we in the R.H.A. consider 1 cwt. too much for mobility.

Major A. O. Green, R.E.: I think it is a good thing that doors and windows do not fit too closely, for I have often found the stables a little stuffy. (Laughter.) My experience is that horses do very well in the open, and do not require to be coddled.

Mr. J. Kettle, Veterinary Surgeon: They require ventilation, but no draught.

Major Knox: I think if the fashion of docking horses were to go out it would remove a defect.

Colonel Maclean: I cannot possibly think that foreign horses are better than ours. I have seen some miserable-looking animals.

Colonel Crealock: A German officer saw the horses of the Royal Dragoons, and he remarked that he never saw the like.

The Chairman: There is a friend of ours present who has travelled on the Continent who will, perhaps, contribute to the discussion.

Inspecting Veterinary-Surgeon J. D. Lambert: I do not agree with the opinion that our army horses have deteriorated, and I speak from the experience of nearly thirty-two years' service, very many of them spent in the Cavalry. I think that our army horses are as good as they ever were, and superior to those of any other country. I have seen all the great Continental armies, except the Russian, and during my visits to the different countries paid great attention, as a military veterinary surgeon, to the quality of their horses. I was always obliged to come to the conclusion that our horses are much superior to those of any other army. But besides being conscious of this fact ourselves, foreign governments recognise it too, and all, without exception, show this by constantly employing agents to buy our horses, and especially mares, because their great aim and object is to raise the quality of their horses to our own excellent standard. I beg, therefore, to urge that we may be confident that our horses of the present day will not, speaking generally, suffer by comparison with those of any former period. When we consider the great and beneficial efforts now being made by the Royal Agricultural Society, the Hunters' Improvement Society, and others, as well as the encouragement given by Parliament, we may rest assured that our horses will still maintain their superiority over those of all other countries.

Major F. W. Campbell, R.A.: Small horses, well bred, will do more work than big coarse horses, which require so much food.

Mr. F. Smith, Veterinary Surgeon, Professor Army Veterinary School: The horses in France are decidedly inferior to our own; moreover, their condition and stable management is bad. In Germany I had an opportunity of seeing regiments which had just returned from some severe manœuvres. I unhesitatingly state that the condition of their animals and their general

fitness for work was vastly superior to what our horses would be if they had undergone the same trial and severe exertion. I do not attribute this to any superiority on the part of the horses themselves, but to something in the German system of management. I was especially struck by the absence of sore backs, in spite of heavy weights, and the great freedom from sickness and lameness; the absence of sore backs is due, amongst other causes, to their system of saddling, which is superior to ours. The question of the crushing weight carried by Cavalry horses is one of serious importance, and, perhaps, worse than all is, that the terrible weights have to be carried on a saddle which is decidedly bad. We must remember that the question of weights and sore backs go hand in hand; if we are to keep backs in serviceable condition, not only must we reduce the weight carried, but the fitting of saddles must be carried out in a scientific manner, based on an intelligent knowledge of the structure and conformation of a horse's back, a knowledge which, I do not hesitate in saying, is far from being generally shown at present. I am satisfied that there are comparatively few officers who have any idea how saddles should be fitted to avoid the various injuries to which backs, sides, and withers are liable, and it is in these very cases that, so far as my experience goes, the fitting and alterations are left to irresponsible subordinates. If officers were taught the conformation and structure of a horse's back, how to recognise the cause of even the slightest abrasion under the saddle, and what alterations to make in order to avoid a continuance of the same, I am satisfied that we would have a considerable reduction in the number of cases of sore back which occur as soon as an army takes the field. The subject of corn-crushers has been mentioned this evening; no one, I think, will deny their value, but I am afraid they would go the way of most chaff-cutters, and be always out of order. The extra labour imposed on the men in using these machines is the cause of their being so often out of repair. Feeding horses four or five times a day would be an advantage. I do not think regulations would prevent it; it is a question for commanding officers to settle. It means, of course, much more work for the men.

Lieutenant-Colonel T. Burnett, R.H.A.: I can bear out what Dr. Fleming tells us as regards the necessity of having a scale of food for horses of different sizes. Every officer commanding a battery of Artillery knows that a 16-2 gun leader requires more food than a 15-2 detachment horse, and divides the forage accordingly. This has always been the custom in my regiment. 2 lbs. oats extra for draught horses would help us very much. I confess I am much surprised at a statement I have just heard that the stuffing of the panels of saddles is confided to the care of an "orderly corporal." I cannot imagine such a practice being permitted for a moment in my regiment or battery, and certainly never heard of it until now.

The Lecturer: I came here not to instruct, but to be instructed; and in introducing the various matters I looked forward to receiving information. I am not disappointed, though several important points have not been so fully dealt with as I should have liked. The water is, of course, an important matter, but we are obliged to take it as we get it, so that we cannot go far into its discussion. On the general question with regard to the management of horses—I only incidentally alluded to the food and water. With regard to the feeding, I think there can be very little doubt we feed the horses unreasonably. We give to all horses very much the same allowance of food, though some do not perform the same amount of work. I think we should feed them not only according to their size, but according to the work they do. At some Cavalry stations horses do not require so much food in winter, and I remember when we used to save a quantity of the winter's oats for the summer drills. It is not very satisfactory when you have to take from one

horse in a troop to give to another. I think there should be a generally recognised scale for the feeding—a scale for large, medium-sized, and small horses; also a scale for hard work and a scale for light work. This is perfectly reasonable, and I cannot see why it has not been adopted before. With regard to the quantity of oats and hay which should be given, it should be remembered that hay is bulky food, and contains much less work-yielding power than oats. The work of a Cavalry horse is similar to that of a hunter, and you know how to feed a hunter. Therefore, the food of a Cavalry horse should be approximately the same. The next question was with regard to the crushing of oats. Crushed oats are decidedly advantageous, not only on the score of economy, but also on that of digestibility; and whenever possible they should be given in preference to whole oats, especially to Cavalry horses, as they are more quickly masticated and digested, and there is no waste. In a paper which I shall read at the United Service Institution I intend to insist on the oats being, as far as possible, crushed, and on the establishment of proper centres for the crushing of oats. I have long looked upon it as a bad system indeed to feed our horses on the contract system. The Government should do it, and it would be better for ourselves and for the public. Crushed oats are far better for an animal when his digestion is weak after a hard day's work. I also intend to insist upon the supply of oats and hay sent into the field being prepared and compressed, and that they should not be fed out of the present nose-bags, which rest on the ground and wear out in a short time, and which waste the food. If a horizontal nose-bag is used it never reaches the ground, and the horse can get to the bottom of it, and if the hay is chopped it can be mixed conveniently with the oats. Of course, it would be impossible on service to crush and compress oats; this must be done at home. We know what takes place with regard to the haycutters. Hay should be prepared by the Government. With regard to the weight on the horses' backs, it has been, I think, very materially increased. If the weight had been the same in the Crimea, I do not understand how the horses could have moved. I cannot conceive how horses, weighted as at present, would be able to carry this weight on active service, nor how we can expect them to carry 19, 20, or even 23 stone on a long day's march, and perhaps do a gallop at the end of it. It cannot be done. If we had a war on our hands next month, or in two months' time, we should be extremely hard pushed to get Cavalry horses for it. Therefore it is highly necessary that we should take care of the horses. Every ounce possible should be taken off their backs and put on wheels. Just as you lighten the horse, so you will have him less liable to develop a sore back, break down in the limbs, or succumb to fatigue. The chief cause of sore backs is badly-fitting saddles, for if you have a badly-fitting saddle, a sore back will surely come with a pressure of 20 stone, and even with well-fitting saddles, if the weight is great, the pressure damages the skin, and that results in a sore back. Taking the average weight of the men of a regiment is fallacious, for as the speed of a regiment depends upon the slowest horse, so should the weight of a regiment rather be calculated upon its heaviest man. Then something was said about docked horses. If you dock a horse you deprive him of nature's protection against flies. If the troop horse has to stand in the open air in summer he must have his natural tail. If it is too short for him to reach his flanks with it, he will be kept in perpetual agony by the flies. It is absolutely essential, if you would keep horses in health and good condition in summer, that you should not cut off their tails. Then as to the quality of horses. I am afraid we have a very large percentage of under-bred draught horses in the service. An under-bred horse is not the horse for work; he soon gives in when severely tested. Horses for Cavalry purposes require breeding, and the better bred they are, the better will they meet the requirements of active

service. Just as you are now striving to give the Infantry the best rifle in the world, so should it be your desire to mount the Cavalryman on the best possible horse. (Applause.) I maintain that £5 saved in a troop horse is very bad economy indeed for the country; and as we breed the best horses I do not see why we should not have the best mounted Cavalry in Europe. (Applause.) Our horses are not so good as they might be, and many might conclude that they are not so good or so durable as they formerly were. I am extremely gratified to find the Lieutenant-General Commanding and so many officers taking such great interest in this subject, and assisting us in the consideration of this important question regarding army horses.

Colonel Crealock: I may say that the forage contract system does not exist here.

The Lecturer: I believe this station is an exception, but it exists everywhere else.

The Chairman: I am extremely pleased to hear the opinion that our horses of to-day are even as good as they were. It is very gratifying considering the tendency which exists to depreciate everything of the present. Of the various points which have been discussed I cannot conceive anything more important than the weight on the horse. This greatly depends upon the amount of clothing and other articles carried. I should like to see a new order of parade. I should like to see a "fighting order" parade, where everything is as light as possible, and the movements of troops made with the greatest possible speed. (Applause.) I think it would be a great advantage to all branches if we had a "fighting order" parade. The only point which occurs to me as being of prime importance as affecting the supply of horses is the docking of the tails. I think there should be an Act of Parliament forbidding horses' tails being docked. (Hear, hear.) I think it is a most ridiculous custom, and in addition to the look of the thing being ridiculous it is very cruel if the horses have to be used in summer. If Sir Frederick FitzWygram were to take the matter up, he would have our support in taking any step he might think proper in the House of Parliament. Allow me, Mr. Fleming, to thank you on behalf of the Military Society for this, one of the most interesting of all the interesting lectures which we have had. (Loud applause.)

Reviews.

THE PHYSIOLOGY OF THE DOMESTIC ANIMALS. By R. M. SMITH, A.M., M.D. (Philadelphia and London: F. A. Davis. 1889.)

It is very remarkable that until now no work on the physiology of the domestic animals has appeared in the English language, though Continental countries, and particularly France and Germany, have been in possession of excellent treatises for a long time. The reason probably lies in the fact that our profession has not produced a physiologist, the instruction of veterinary students in that department of medical science having been delegated to members of the sister profession. This is a matter for regret, as these gentlemen, though quite competent to teach the elements of general physiology, yet could not claim, perhaps, such a perfect acquaintance with the special physiology of the animals veterinary surgeons have to deal with as is necessary for our graduates.

Dr. Meade Smith has generously and courageously volunteered to fill up the regrettable void in our instructional literature, by giving us a text-book which is, we venture to assert, second to none of the con-

tinental works on the subject, and which will put our students in possession of what they have so long been in urgent need of. Though not belonging to our profession, Dr. Meade has been lecturing on physiology in the veterinary department of the University of Pennsylvania; and recognising the serious disadvantage under which his students laboured in being compelled to rely solely on the notes they were able to take during the lectures, he set himself the somewhat heavy task of placing them in as favourable a position in this respect as medical students. Hitherto, the only available treatises have been those on general and human physiology. Thanks to the author, recourse to these is no longer necessary.

The work, which is voluminous (consisting of more than nine hundred pages), follows the usual plan in having one part devoted to general physiology, and another to special physiology. Each of these parts is dealt with in much detail, and the information given is quite up to date; while the language employed is clear and concise, the descriptions being enhanced by excellent wood-cuts (more than four hundred in number) and diagrams. Too much praise can scarcely be awarded for the manner in which the book has been produced; all previous writers on animal physiology have been consulted, the works of Colin, Munk Bruckmüller, Gurlt, Müller, Thanhoffer, Ellenberger, and others having been laid under contribution; while the typography and general get-up of the volume are in every way creditable. In the special part we should have been gratified to see some allusion to the physiology of the horse's foot, an organ of more importance in the veterinary student's studies than the eye or the ear. But this omission may be remedied in a second edition, which should soon be demanded. In the meantime, there is every reason to be thankful for the boon which Dr. Meade has conferred upon the veterinary profession, and we take this early opportunity of expressing our indebtedness to him, while cordially recommending his text-book for recognition and acceptance as a classical treatise on a most important subject.

Hog Cholera: Its History, Nature, and Treatment. By D. E. Salmon, D.V.S. (Washington: Government Printing Office. 1889.)

This is one of the valuable publications issued from time to time by what is termed the Bureau of Animal Industry, a section of the United States Department of Agriculture which confers great benefits by the investigations it undertakes, of animal diseases and other matters more or less closely related to agrarian pursuits. The work has been produced by the eminent veterinarian, Dr. Salmon, who has particularly distinguished himself as a most intelligent and indefatigable investigator of the wide-spread contagious and destructive malady generally known as Swine Plague, Swine Fever, and Hog Cholera, in which he was the first to demonstrate that pigeons could be rendered refractory to Hog-Cholera poison by previous inoculation with sterilised culture-liquid containing the germs of that disease. (See Veterinary Journal for last July, page 6.) Everything pertaining to the scourge is elaborately dealt with,

and the addition of sixteen capital plates adds greatly to the value of the monograph, which is certainly the very best on the subject in any language. The investigations and experiments cover a long period, and throw much light on this plague of swine. It appears that the investigations, in which several persons were employed, were latterly so systematised as to produce the most satisfactory results. In 1885, a motile bacillus was discovered to be the active agent in causing the malady, and its prominent characteristics were then described. In 1886, the production of immunity by chemical products was demonstrated, the effect of disinfectants on the contagium was thoroughly studied, and the presence of another epizoötic disease of the porcine family, to which the author gives the designation of "Swine Plague," was notified. These discoveries, Salmon states, solve the most important problems connected with swine epizooties, and give a secure scientific basis from which to work in future; and he asserts that these diseases are now much better understood than are most of the contagious disorders of mankind; while the measures applicable to their prevention, in the present condition of science, are equally as apparent as are those required for human plagues.

Salmon remarks that, owing to the fact that there are recognised at the present time three distinct infectious diseases of swine in different parts of Europe and America, it is impossible to state whether the disorder known as Swine Fever in this country represents two distinct maladies —Hog Cholera and Swine Plague, or Hog Cholera alone. This question, he is of opinion, can only be solved by a thorough bacteriological investigation, such as has not been made in very recent years; though he thinks there is enough evidence to warrant the statement that this Hog Cholera is prevalent in the United Kingdom; but, he adds, there is, on the other hand, no experimental basis for the statement that the Swine Plague also exists here. He says that the two diseases produce lesions of the large intestine so easily confounded with each other, that great care must be observed in making a diagnosis. He also considers that the three well-marked swine diseases now known as Hog Cholera, Swine Plague, and *Rouget*, were only a few years ago regarded as one malady and designated by several names; and even to-day no clear idea exists among most pathologists as to what the precise differences between these diseases are.

Salmon does not regard the symptoms of Hog Cholera as entirely characteristic, owing to the many forms the disease may assume; and also, owing to the difficulty experienced in making careful thermometric and other clinical observations on pigs, the course of the disease cannot be easily determined. It is regarded as manifesting itself in an acute and chronic form. In the acute form the animals die very suddenly, the illness only lasting from a few hours to a day; while in the chronic form it may continue from three weeks to several months. The animals become stupid and dull, refuse to eat, and generally separate themselves from the others. Weakness ensues, and the movements become feeble and tottering. A common symptom is diarrhœa, which may appear very soon after the animal becomes unwell, and continue

until it succumbs. In protracted cases the liver is sometimes affected secondarily, through the impaired condition of the large intestine.

To show how little dependence can be placed upon symptoms in forming a diagnosis during life, the following general description is furnished from notes taken at the experimental establishment. "The temperature of healthy pigs ranges between 101° and 101½° Fahr. With sick animals it may rise from 1° to 3° above the temperature observed in health. Frequently this elevation is absent. During an outbreak, elevation of temperature may be considered diagnostic, but absence of such elevation proves nothing, since an animal may die without having shown any rise of temperature during the disease. There is rarely any cold or shivering stage. The sick animals are dumpish, spiritless, and lie quietly in a corner, or huddle together, hiding the head under the litter. They refuse to move, even when disturbed, and are more or less oblivious to surroundings. There is more or less loss of appetite. They usually continue to eat a little, however, and often the appetite is rarely impaired during the whole course of the disease. Acute cases may be seen feeding before they are found dead an hour or so later. In most cases the stomach is well filled after death. The bowels may be costive at the outset, or continue apparently normal for some time; or they soon become costive, and remain so, in some cases throughout the disease. In the later stages, diarrhœa of a liquid, fœtid character appears in many cases. The colour of the discharges depends largely upon the feed. In slop or garbage-fed pigs, they are usually of a dirty black colour. In those fed with grain, they are light yellowish. The diarrhœa persists until death. Vomiting is absent.

"Respiration is only occasionally quickened and laboured in the latter stages. The pulse is more rapid than in health, but its determination is unsatisfactory, owing to the struggles of the animal when held. Cough is infrequent, and then only heard when the animals are aroused, as a single effort or in paroxysms. The skin is frequently found reddened on the nose, abdomen, inside of limbs, the ears, and over the pubic region. The redness is diffuse, varying from a slight blush to a deep bluish-red or purple. It increases as death approaches, and is usually found at the autopsy. A skin eruption appears occasionally, which is followed by crusts or scabs of varying size. Reddening of the skin is a symptom common to the other swine diseases, *Rouget* and Swine Plague. The eyes are apt to be watery. This is frequently the first outward sign. Later, the discharge becomes thick, yellowish, often gumming the lids together. Towards the end of the disease the animals have a gaunt appearance, with arched back and staring coat. Emaciation is very rapid. The weakness manifests itself in a staggering, uncertain gait, as if the animal were about to fall. Death ensues quietly; rarely convulsive kicking is observed. The mortality is very high; usually from 80 to 90 per cent. of those attacked die. The symptoms vary in intensity, and only a certain number are seen in one animal at the same time. In very chronic cases only the autopsy enabled us to make a diagnosis."

With regard to the lesions produced by the disease, these are well exhibited in the eight plates which form a portion of the illustrations, while the letterpress describes them as follows:—"*a. The Acute type.* This might with equal propriety be called the hæmorrhagic type, inasmuch as the chief, and perhaps the only changes are hæmorrhagic in character; and these lesions are seen most clearly when an animal is examined immediately after death. The spleen is invariably enlarged, soft, gorged with blood. Sometimes it is twice as long as the normal spleen (the other dimensions being proportionately increased), and it may extend across the median line to the right side. Next to the spleen, the lymphatic glands and serous membranes are most severely involved. The cortex shows, on section, as a hæmorrhagic line or band, according to the amount of extravasated blood, or the entire gland may be infiltrated with it. Among the glands most commonly hæmorrhagic are those of the meso-colon (large intestine), those at the root of the lungs (bronchial), and on the posterior thoracic aorta. Besides these, the retro-peritoneal and gastric glands (lesser omentum) may be involved. Most rarely the mesenteric glands show extravasations to a slight extent. Hæmorrhages are also quite frequent beneath the serous surfaces of abdomen and thorax. They are most abundant under the serosa of the large and small intestines as petechiæ and larger patches. They are occasionally found under the peritoneum near the kidneys, the diaphragm, the costal pleura, as extravasations nearly an inch across. The lungs, in a small percentage of cases, show subpleural ecchymoses in large numbers, and, on section, small hæmorrhagic foci are observed throughout the lung tissue. In a few cases severe hæmorrhages, involving one or more lobes, have been observed. The kidneys are occasionally the seat of extensive hæmorrhagic changes. The glomeruli appear as blood-red points; larger extravasations occur in the medullary substance, and blood may collect around the apices of the papillæ. The subcutaneous tissue over the ventral surface of the body may be dotted with petechiæ, and occasionally collections of blood (hæmatomata) are found in the superficial muscular tissue. The brain and spinal cord have not been examined for want of time. In one case, however, in which they were laid bare, petechiæ were seen on the cerebellum. The digestive tract usually is the seat of extensive lesions. The fundus of the stomach is, as a rule, deeply reddened; there may be more or less hæmorrhage on the surface, giving rise to patches or larger sheets of blood-clots. The small intestine, in some cases, has submucous ecchymoses throughout its entire length. In the large intestine the ecchymoses may be so numerous as to give the membrane a dark-red appearance. The food is now and then found incased in sheets of blood-clot, due to hæmorrhage on the surface.

"*b. The Chronic form* is perhaps the most common, at least in those epizooties which we have studied. The acute hæmorrhagic cases usually die in the beginning of an outbreak, and are apt to be overlooked. Following these are the more protracted, milder cases. In these animals the disease is apt to be limited, in its severe manifestations, to the large intestine. The other organs, however, are not

exempt from degenerative changes, owing, in part, to the impairment of the functions of the large intestine, consequent fermentations, and the absorption of poisons thereby produced; in part to the presence of the specific bacteria in the spleen, and presumably in other organs where they exercise their poisonous activity.

"The lesions of the large intestines are necrotic and ulcerative in character. The ulcers may be isolated and appear as circular, slightly projecting masses, stained yellow or blackish, or both, in alternate rings; or they may be slightly depressed and somewhat ragged in outline. When the superficial slough is scraped away, many ulcers show a greyish or whitish bottom. A vertical section reveals a rather firm neoplastic growth, extending usually to the inner muscular coat. When sections of such ulcers are stained with aniline dyes, and are examined under the microscope, we notice the submucous tissue very much thickened, infiltrated with round cells, and containing a large number of dilated vessels. Resting upon this thickened submucosa is a line of very deeply-stained amorphous matter, and upon this is situated the necrotic mass, which fails to retain the colouring matter, and is penetrated by an immense number of bacteria of various kinds. Frequently ova of the *tricocephalus* are imbedded in the slough. The extent of the submucous infiltration depends upon the age of the ulcer. In old ulcers it contains many newly-formed capillaries, and evidences of the formation of connective tissue are present. The capillaries may extend to the very edge of the border where the slough begins. The latter may have been partly shed, leaving a smooth line bounding the cicatricial tissue. The submucous infiltration gradually disappears as we leave the centre of the ulcer, and somewhat outside of the ulcer no inflammation of the membrane is observable. Giant cells may be seen, in some cases, in the intertubular tissue at the edge of the ulcer. In very young ulcers it is frequently possible to observe the fundi of the tubules intact, while the inner or free half is converted into an amorphous mass. The depth to which the infiltration extends is not always limited to the submucosa; it may extend into the muscular coats and cause inflammatory thickening there, and inflammation and the formation of new vessels in the subjacent serosa.

"In some cases the necrosis, instead of appearing in circumscribed ulcers from one-sixteenth to one-half inch or more across, involves the whole surface of the mucosa, giving it the appearance of a so-called diphtheritic membrane. In such cases the walls of the intestine are very much thickened, and so friable as to be easily torn with the forceps in handling. Such necrosis is rare in spontaneous cases, but it quite invariably appears in animals which have been fed with pure cultures of Hog-cholera bacilli. The distribution of the ulcers varies but slightly. They appear most frequently in the cæcum and on the ileo-cæcal valve, as well as in the upper half of the colon. The lower half is implicated in severe cases only, and then less extensively. The rectum is only very rarely ulcerated. The lower portion of the ileum is ulcerated in a small percentage of animals, especially when they have been fed with Hog-cholera viscera or cultures. The stomach is occasionally the seat

of slight ulceration. The lymphatic glands of the affected intestine are usually much enlarged, pale, tough, whitish on section. The spleen is rarely enlarged ; the liver shows degenerative changes (softening of the parenchyma, increase of connective tissue). Heart and lungs are usually normal. The lobular Pneumonia frequently found in young pigs in the winter months must be ascribed primarily to exposure rather than to the disease.

"In some outbreaks the acute and the chronic types of the disease are not so clearly distinct as in the foregoing pages. Frequently, recent hæmorrhagic lesions seem to be grafted upon cases presenting extensive ulcerations, which certainly are much older than the extravasations. It may be that the latter are the result of a secondary invasion of the Hog-cholera virus, either from the ulcers in the intestine, or from without."

The disease is quite distinct from human Typhoid, and is more allied to Dysentery : anatomically Hog-cholera and Diphtheritic Dysentery are very much alike. The bacillus of the Swine disorder is fatal to mice, rabbits, guinea-pigs, and pigeons, when subcutaneously inoculated. The disease has never been known to be transferred to mankind.

The most common sources and channels of infection are shown to be : *a.* Pigs purchased from infected herds, or coming in contact with those from infected farms, or running over grounds occupied by diseased swine within two or three months ; *b.* Infected streams may communicate the disease to herds below the source of infection ; *c.* Virus may be carried in feed, implements, and on the feet and clothing of persons from infected herds and premises ; *d.* Winds, insects, birds, and various animals may transport the virus.

The preventive and suppressive measures Salmon proposes are based on this knowledge of its extension.

We have dealt thus lengthily with the work before us, because the disease in question is of such a serious character in this country, and the more light that is thrown upon it so the more likely is it to be quickly and effectively combated. And now we have to congratulate our American *confrère* on having given us a most valuable treatise on the subject, and to acknowledge the successful result of his long and patient investigations, conducted with so much skill and enthusiasm.

THE DISEASES AND DISORDERS OF THE OX. By GEORGE and Dr. ALFRED GRESSWELL. (London : W. H. Allen and Co. 1889.)

This is another popular work on the diseases of cattle, chiefly, with some mention of those peculiar to sheep. In several respects the book differs from those on the same subject which have preceded it, especially with regard to the philosophical spirit which pervades it, and the attempt to treat of the bovine and ovine disorders from a comparative pathologist's point of view. The authors inform us that to their brothers in the veterinary profession is due some of the information the work contains, but that very much of it has been derived from their father, "the late Mr. Alderman Dan Gresswell, F.R.C.V.S., whose long and honourable connection with Science, as one of her most persevering, enthusiastic, and successful votaries is known throughout the world."

Though intended for agriculturists, the book may be consulted with profit by veterinary surgeons, as it contains much that is original, while that which is familiar is written in a very attractive style. There are nearly one hundred woodcuts and four plates to illustrate the verbal descriptions, and altogether the work deserves praise as another addition to the list of useful books intended to promote the welfare of agriculture and the wellbeing of valuable animals.

Proceedings of Veterinary Medical Societies, &c.

ROYAL COLLEGE OF VETERINARY SURGEONS.

QUARTERLY MEETING OF COUNCIL, HELD JULY 1ST, 1889.

Professor J. W. AXE, President, in the chair.

Present: Sir Frederick Fitzwygram, Professors Williams, Brown, Walley, Duguid, Pritchard; Messrs. J. D. Barford, E. C. Dray, H. Kidd, W. Wilson, Wragg, Woods, J. F. Simpson, T. Greaves, W. Whittle, W. Hunting, J. Roalfe Cox, J. D. Lambert, T. Briggs, W. F. Mulvey; Mr. G. Thatcher, Solicitor; and Mr. A. W. Hill, Secretary.

The SECRETARY announced that letters expressing regret at inability to attend had been received from Dr. George Fleming, Professor McCall, Sir Henry Simpson, and Messrs. Taylor and Perrins.

The SECRETARY announced that the following presentations had been made to the library: work on "The Tropical Diseases of the Horse," by William Burke, Army Veterinary Department; and "The Annual Statistical and General Report of the Army Veterinary Department," by Dr. George Fleming.

Mr. DRAY proposed a vote of thanks to Dr. Fleming and Mr. Burke.

Mr. WOODS seconded the motion, which was unanimously agreed to.

The SECRETARY read a letter from Dr. McBride with regard to an application on behalf of his brother, who has gone abroad, for a certificate in lieu of lost diploma.

Mr. J. F. SIMPSON thought that the Council should not merely accept the written statement of a gentleman to the effect that he had lost his diploma. Dr. McBride should pursue the ordinary course of making a proper declaration before a Commissioner or a magistrate, before the Council could think of entertaining his proposal.

The letter was ordered to be laid upon the table.

Report of Finance Committee.

Mr. DRAY proposed that the report of the Finance Committee should be taken as read, and that the Council should sanction the drawing of cheques to meet the liabilities of the current year.

Professsor WALLEY seconded the motion, which was agreed to.

Report of Registration Committee.

On this report and the recommendations contained therein coming up for discussion, it was discovered that a quorum of members was not present to deal with the case of Charles Lawrence, so that the matter stood over until a quorum could be obtained.

Professor WALLEY proposed the adoption of the report of the Registration Committee, with the exception of the recommendation with regard to the case of Charles Lawrence.

Report of General Purposes Committee.

Mr. WRAGG moved the adoption of the report.

Professor WALLEY seconded the motion.

Mr. GREAVES inquired whether the Secretary had received any communication from Mr. Carlisle with reference to his portrait.

The SECRETARY said that no communication had been received.

Mr. GREAVES suggested that the portrait of Mr. Carlisle should be received and hung in the library.

Mr. HUNTING was of opinion that it would be a more graceful act on the part of the Council to let the matter stand as it was. It would be an extremely ungraceful thing on the part of the Council to tack any rider on to the resolution of the Committee.

Mr. SIMPSON said he had had an interview with the donors of the portrait, and he had ascertained that it would be quite in accordance with their wishes that the matter should be settled at once, and the portrait hung in the library.

Mr. WILSON thought the General Purposes Committee should have the power of selecting the most suitable position. If the report of the Commitee were adopted all that was necessary would be done.

The report was then adopted.

Report of Committee appointed to consider the question of recognition of Colonial and Foreign Colleges.

The PRESIDENT stated that in accordance with the Veterinary Surgeons' Act of 1881 it was necessaary that the Royal College of Veterinary Surgeons should recognise certain schools whose graduates it might deem to possess the requisite knowledge and skill for the purpose of practising the veterinary art. Four applications had already been made, two from the Bombay School, one from Ontario, and the other from Victoria. The Council had received a diploma from some, but of course it was no guide whatever as to the period of study, which the graduates in those schools had passed through, nor was it any indication of the nature and extent of education to which they had been submitted. It was quite impossible therefore for the Committee to take any further steps at the present time, but they had suggested that the Secretary should be instructed to write to the various colonial and foreign schools to obtain prospectuses with a view of determining the nature and extent of the education which they afforded to their graduates, and the period of study through which they passed. It was a very important question, inasmuch as soon as they recognised a school they would be compelled to recognise graduates of that school on the payment of a sum not exceeding five guineas as a registration fee. It would then be competent for such graduates of foreign and colonial schools to enter into competition with them in this country as practitioners of the veterinary art. The Committee did not see their way clear to make any suggestion at present, but as soon as they had obtained prospectuses of the various schools they could determine their respective merits, and so would be in a position to recommend to the Council what schools should be recognised in the future.

Mr. WILSON moved the adoption of the report of the Committee.

Mr. DRAY seconded the motion, which was agreed to.

Report of the Court of Examiners.

Professor WALLEY wished to ask one or two questions. He said that the Final Examination was divided into two sections, the Oral and the Practical, and if a student gained three "goods" or "very goods" in the Oral and failed to gain similar marks in the Practical, or *vice versa*, those marks were not

allowed to be placed on record in either of those parts against his name. He thought that was hardly in accordance with the spirit of the giving of honours. He considered that if a student passed the Oral Examination with great credit it should be recorded against him without any reference to the two parts, and the same in reference to the Practical part.

Professor PRITCHARD totally disagreed with the remarks of Professor Walley. He thought it would be straining a point if a man by his ability obtained great credit, or very great credit, in his Oral and failed in his Practical, to say that it was a double examination.

Professor WILLIAMS said that the whole subject wanted reconsideration. He thought that honours should be given to the men who had passed in all the subjects from the beginning with a majority of good marks.

Mr. WILSON said that now the question had been raised, it seemed to him that the other examinations wanted a little consideration as well as the Final. He thought the matter should be referred to some other, say the Bye-laws Committee, to consider the whole question.

Professor WALLEY said that if it was the wish of the meeting he would refer the whole matter to a small committee.

Mr. WILSON thought it was too much to expect a young man in the limited space of seven months to master such sciences as chemistry, botany, and anatomy. He would like to propose that a committee should be formed for the purpose of considering the present condition of their examinations generally.

Mr. SIMPSON asked how the marks of honour were arrived at by the examiners in the C Examination.

Professor WALLEY: By the biggest record in the Oral.

The PRESIDENT inquired whether it was a fact that the examiners in the Oral did not confer with those in the Practical as to the marks which the student should receive on completing his examination.

Professor WALLEY said there was not the slightest consultation whatever.

The PRESIDENT read the bye-law on that point, which is as follows:—"That the Final Examining Board shall consist of two sections, the first to conduct the Oral, and the second the Practical; and that their awards be disjoined."

Mr. SIMPSON thought the attention of the Examining Board should be called to that bye-law.

Professor WILLIAMS proposed, "That the examiners in Class C be instructed to confer honour or credit on all students who obtain a majority of 'very good' or 'good' marks in either section of the examination."

Mr. SIMPSON seconded the proposition.

Professor PRITCHARD moved as an amendment, "That no pupil be awarded honours who fails to pass either section of Class C Examination."

Mr. HUNTING seconded the amendment.

Sir F. FITZWYGRAM did not understand whether it was intended that if a student gained honours in the Oral and failed in the Practical, but subsequently passed his Practical well and satisfactorily, he should be credited with passing in honours.

Mr. WILSON was strongly of opinion that the word "successful" should be inserted in the resolution.

Professor DUGUID maintained that the examiners should not give their awards; that it should be an instruction to the Secretary and not to the examiners.

Some further discussion took place, at the close of which

Professor WILLIAMS proposed his amended resolution as follows; "That the Secretary of the Examining Board in Class C Examination be instructed to record honour or credit upon all successful students who have obtained

a majority of 'good' or 'very good' marks in both sections of the examination."

Professor WALLEY seconded the resolution.

Mr. HUNTING proposed as an amendment, "That the giving of credit marks to students at all examinations be left to the examiners as before."

The amendment was put to the meeting and declared carried, eight voting in its favour and seven against.

Consideration of Case of Charles Lawrence.

There being a quorum of members now present the Council went into the consideration of the case of Mr. Charles Lawrence.

The SECRETARY explained that as there was not a quorum at the last Council meeting the case could not then be considered. It was now brought up again under the following circumstances: Mr. Charles Lawrence had been summoned before the Registration Committee to show cause why his name should not be struck off the Register. He had pleaded guilty to the charge of embezzlement. After due consideration, the Committee recommended to the Council that his name should be removed from the Register under the Veterinary Act, and that his attention should be called to Clause 7 of the Act giving power for the restoration of names to the Register.

Mr. THATCHER read the notice of conviction, dated the 29th of April, 1887, of Charles Lawrence, on a charge of embezzling the sum of £10.

Mr. BARFORD moved the adoption of the report of the Registration Committee, so far as the case of Charles Lawrence was concerned.

Mr. KIDD seconded the motion.

The clauses of the Veterinary Surgeons' Act, 1881, dealing with the matter of the motion, was put from the chair and passed, twenty-two members voting in its favour.

Report from the Court of Examiners for the Fellowship Degree.

The SECRETARY announced that the following gentlemen had passed the Fellowship degree on the 24th of April last:—Messrs. J. E. Peele, J. G. Parr, G. J. Pickering, R. C. Irving, and D. M. Storrar.

Appointment of Examiners for the Fellowship Degree.

Mr. SIMPSON moved the re-appointment of the present examiners.

Mr. J. R. COX seconded the motion.

Mr. DRAY suggested that Mr. Cox's name be added.

Mr. COX, in declining, said he much preferred the examining body should stand as before.

The resolution was agreed to.

Appointment of Committees for the Year.

Mr. J. R. COX said he desired, in view of any inconvenience that might arise, that his name should not be associated with the committees about to be appointed. He had heard of late the insinuation and suggestion that the profession had now become dissatisfied with what had been termed the dual appointment—the office of examiner and the membership of the Council—in other words, that the honour of being examiner was now considered to render the individual undesirable to assist the Council for the advance, honour, and welfare of the profession. If that proposition was tenable, the sooner the better should men be sought who could be trusted honourably to perform the functions of the two responsibilities. In furtherance of his desire to serve their cause as best he might, he had endeavoured to inform himself to what extent the views that had been urged were the views of a very considerable and important part of the profession. He found that on the occasion of his

being elected to office there were something less than 700 members who voted, and that of that number between 500 and 600 paid him the high compliment to invite his services again on the Council, knowing very well that he was on the Examining Board. He could not but consider that he should be breaking faith with a very great majority of the profession if he were to resign. It was his duty to stick to the ship. He took it that those of their members who exercised their right to assist in the appointment of members of the Council, and who took the trouble to record their vote, were representatives of the profession. At the same time it would be a matter of satisfaction to him to be the first to bow to the wishes of the profession, and to leave a seat on the Council vacant. He desired also to say that he was sorry to see that the question of the regrettable errors enacted at Edinburgh had again been revived in print. It was a pity that that matter had not been allowed to remain in oblivion, but as it was revived in print, some action must come from the Council. It was to the lasting regret of all the members of the Examining Board at that time, that in opposition to the desires and to the strict order of the Council, its solicitations and challenge were glossed over. That solicitation and challenge was that there should be such a strict investigation as should probe to the bottom and unearth the root of all that had been at fault. At that time the Council was in correspondence with the Lord Provost of Edinburgh. The official communication from the Council was to urge two enquiries. It was further to propose a scheme by which a perfectly impartial investigation should take place, and to this day the official document remained unanswered, and to this day the College was under the ban of disrespect and discourtesy—some called it insult—in the ignoring of its communications.

Parliamentary Committee.

Mr. SIMPSON moved the re-appointment of the Committee of last year, with the addition of the names of Messrs. Lambert and P. Taylor.

Mr. WILSON seconded the resolution, which was agreed to.

General Purposes Committee.

Mr. MULVEY moved that it be as last year, with the addition of Messrs. Woods and Taylor.

Mr. WRAGG proposed Mr. Hunting and Professor Pritchard, and the resolution, with the additions, was agreed to.

Registration Committee.

Mr. MULVEY moved that it be as last year, with the addition of Professor Pritchard, Messrs. Perrins, Taylor, and Lambert.

The resolution was agreed to.

Bye Laws Committee.

Mr. MULVEY moved that it be as last year, with the addition of Sir H. Simpson, Professor Pritchard, and Mr. Kidd.

Mr. WRAGG proposed Mr. Hunting,

The resolution, with the additions, was agreed to.

Finance Committee.

Mr. DRAY moved that it be as last year, with the addition of Professor Pritchard, Dr. Fleming, Mr. Briggs, and Mr. Taylor.

The resolution was agreed to.

Dinner Committee.

This Committee was re-appointed, with the addition of the names of Professor Pritchard, Mr. Lambert, and Mr. Hunting.

Committee appointed to consider the question of the recognition of Colonial and Foreign Colleges.

Mr. SIMPSON moved that it be as last year, with the addition of the names of Mr. Hunting and Mr. Lambert.

The resolution was agreed to.

Mr. MULVEY moved that the names of the Council and of the members of committees be printed and circulated.

The resolution was agreed to.

Notices of Motion.

Mr. WILSON gave notice of the following motion for the next meeting:—"That section 2, p. 61, be amended thus, by striking out the first sentence and substituting in lieu thereof:—'Students who do not produce one or other of the certificates referred to, shall be examined by a Board of Examiners appointed by and under the direction and supervision of this College, to whom they shall report the result of the examinations, which shall be uniform and applicable to the whole of Great Britain.'"

Mr. BRIGGS said that at the next quarterly meeting of the Council it was his intention to bring forward for discussion the subject of instituting a written examination in addition to the present Oral and Practical Examinations.

Professor WALLEY announced that at the next quarterly meeting he would move that the present percentage of marks, viz., thirty, should be raised to fifty.

Mr. HUNTING announced that he would move a resolution at the next meeting that every candidate for the diploma should produce a certificate of birth before being put on the list.

Surplus Funds.

Sir F. FITZWYGRAM suggested that some of the surplus funds of the College should be expended on putting down a wooden pavement in front of their building in Red Lion Square. The cost would, he understood, be about £300.

Professor WALLEY suggested that in the matter of surplus funds the Council should take into consideration the foundation of scholarships for veterinary students.

SPECIAL MEETING.

The meeting was then made special to consider the undermentioned notice of motion by Professor Brown:

"In line 5 leave out the words 'be allowed to.' In line 6 leave out all the words after 'Practical,' and all the other lines of the paragraph to the end, and add 'He may present himself at any succeeding Practical Examination which may be held during a period of three years from the time of his rejection."

Professor BROWN, in moving the above resolution, said that the effect of it would be that a student who had been rejected at the Oral Examination would do exactly what he pleased, as now, in reference to going back to the College, or going with a member of the Royal College of Veterinary Surgeons; but if he took the latter course he would not be compelled to return to the College for one month previous to the next examination. That part of the law had operated very unsatisfactorily. He therefore proposed that it should stand in this way—that in the event of a student being rejected at his first Practical Examination he might present himself at any succeeding Practical Examination which might be held during a period of three years from the time of his rejection.

Professor WILLIAMS seconded the resolution.

Mr. SIMPSON would like to take the opinion of the members as to the advisability of adopting the course proposed. It seemed to him that the resolution, if passed, would give to the principals of the schools power to say to the students, "You have failed to pass your Practical Examination, and we have done with you; we have no more to do with you; put yourselves in communication with the Royal College of Veterinary Surgeons, throw the responsibility upon them of advising you when your Practical Examination takes place, and take your chance of passing." But so long as they had honourable men like they were at present they need have no fear of that, but he ventured to think that such a time would come. He, therefore, would like to hear the opinions of some other members of the Council as to what they might consider the right course to adopt, and whether they would allow the teaching institutions to say to the student, "It is no business of ours to educate you up to the standard of the Practical Examination. Pass your Oral and we have done with you; go and get your practical knowlege where you will."

Professor WALLEY ventured to suggest that in the event of a change taking place in the heads of the establishment the Council would certainly have sufficient notice to prevent anything of the kind suggested by Mr. Simpson from taking place. It was an easy matter to alter a bye-law at any time.

Professor Brown's resolution was then put and carried.

A vote of thanks to the Chairman terminated the meeting.

SPECIAL MEETING OF THE COUNCIL, HELD JULY 10TH, 1889.

Professor J. WORTLEY AXE, President in the chair.

Present:—Professors G. T. Brown, W. Duguid, W. Pritchard; General Sir Frederick Fitzwygram; Dr. George Fleming; Messrs. J. Roalfe Cox, W. Mulvey, H. R. Perrins, F. W. Wragg, W. Wilson; Mr. George Thatcher, Solicitor, and the Secretary.

The SECRETARY read the notice convening the meeting.

The SECRETARY stated that he had received letters from Professor Walley, Messrs. Briggs, Kidd, and Woods, regretting their inability to attend the meeting.

On the motion of Professor PRITCHARD, seconded by Mr. WILSON, the minutes of the previous meeting were taken as read and confirmed.

The PRESIDENT said that the meeting had been called to confirm the undermentioned alteration of Regulation 7 for the Professional Examinations proposed by Professor Brown, and carried at a special meeting of the Council held on the 1st of July, 1889:—"In line 5 leave out the words 'be allowed to.' In line 6 leave out all the words after 'practical,' and all the other lines of the paragraph to the end, and add 'He may present himself at any succeeding Practical Examination which may be held during a period of three years from the time of his rejection.'" He begged to propose that the resolution as passed at the last meeting be confirmed.

Mr. WRAGG seconded the motion, which was carried unanimously.

General Sir FREDERICK FITZWYGRAM said that there was one point he should like to bring before the meeting. A great deal of confusion seemed to arise from one examination being called the "Oral" and the other being called the "Practical." Both examinations were oral, and he thought it would be advantageous to change the name of the first examination, namely, the Oral, to "the Theoretical Examination," and the other "the Practical." It was true that the gentlemen sitting round the table understood that the Oral Examination meant the Theoretical, and that the Practical meant what

it expressed, and he did not think the term "Oral" Examination conveyed a very clear idea, and the change in that name, therefore, would be advantageous.

The PRESIDENT suggested that perhaps General Sir Frederick Fitzwygram would bring the matter forward at a future meeting.

General Sir FREDERICK FITZWYGRAM said he simply wished to throw out a suggestion in order that it might be taken into consideration, and he would hand in a notice of motion at the next quarterly meeting.

The proceedings then terminated with a vote of thanks to the President.

CENTRAL VETERINARY MEDICAL SOCIETY.

AN ordinary general meeting of this Society was held at the First Avenue Hotel, Holborn, on July 4th, 1889. In the unavoidable absence of the President, the senior Vice-President, Mr. Frank Wragg, occupied the chair.

A letter was read from Mr. H. Brown, Jun., tendering his resignation, which was accepted with regret.

The HONORARY SECRETARY read the Report of the Special Committee on "The Education and Examination of Veterinary Students." The resolutions adopted by the Committee were as follows: 1. "That the matriculation examination should be of a uniform standard for all schools, and of a more stringent character than at present;" 2. "That a separate table be established in Materia Medica and Therapeutics at the Final Examination;" 3. "That Hygiene be included as a special subject for examination;" 4. "That the existing 'A' Examination be merged into that of 'B';" 5. "That a written examination be added to the oral;" 6. "That if a written examination be adopted the questions asked be subsequently published."

The Report having been received, Mr. RAYMOND expressed his regret at being unable to adopt Mr. Hunting's scheme of two examinations only, instead of three. His chief reason was that he considered it unfair to expect a student to have at his finger ends, for the momentous forty minutes of the examination, such a mass of information as is represented by Anatomy, Chemistry, Physiology, Botany, and Hygiene; and he asserted most strongly that if the examination was at all searching it is too much to expect from any student. Rightly or wrongly, it is said on all hands that students are now below par, and that a very low percentage of correct answers will procure a pass. If this be true, how can one expect to improve the state of affairs by concentration? If the average student is weak when examined on two or three subjects, how is he to be stronger if taken on five or six, even with a little more time? He pointed out that the extra time given "cuts both ways," for it is possible to forget a good deal during a six months' run in the country. He would put himself in the position of a student, and as such he should much prefer the three exams. to two. A large section of Mr. Hunting's supporters were entertaining a well-founded fear that the profession is greatly overcrowded, and welcomed any scheme which would be likely to exercise a check; as Mr. Hunting says, "We have no special desire for the influx of new recruits." Now we have a perfect right to prevent overcrowding, if we can do so by fair means; but the profession should not forget that it owes a duty to the public and to young men who enter as students, and neither are likely to submit to our checking the supply of veterinary surgeons by sharp practice. But a great many of Mr. Hunting's supporters go even farther, and demand that the exams. should also be made more stringent; so it comes to this, the student who is said to be hardly able to blunder through two subjects when leniently treated is to be allowed a periodical run at grass, in order that he may get out of gear and forget as much as possible of what he has learnt; he is then to be examined on five or six instead of two or three subjects, and the exam. is to be made much

more stringent. If the Council should adopt this idea he was afraid the students and the public would treat us to clamour of the Edinburgh sort, and the examiners would have to eat dirt, or, in other words, the standard would be quickly lowered and the object of the profession defeated. There is a good deal of talk about cramming, but really there is no examination passed without cramming, unless it be when a horse is examined for soundness. The problem the profession desires to have solved is, How is the efficiency of the student to be increased? how is over-crowding to be prevented? He feared the question of over-crowding was far more difficult to answer than the other. He considered the time was rapidly approaching when the tinkering system will have to be dropped, and the question of efficiency boldly faced. The fact is that our profession has made such rapid strides that it is gaining popularity amongst a more numerous and higher social class. The most casual observer could see this if he would only visit Camden Town. Many members of this class were not so accustomed to animals as they ought to be, and they therefore experienced more difficulty at starting in practice. On the other hand, they are better provided with means to go through a lengthy curriculum. The suggestions which he would offer were based on the above, and were, Raise the entrance fee to the schools (the Melbourne College fee is £105). It is all very well to talk of the poor man, but those who desire the profession to rise must endeavour to get hold of the best material to work on, and where it is a question of rising socially the man with some means will have the better chance. In fact, the increased demands of the public require higher proficiency, and therefore longer study, and longer study entails more expense. Raising the school fees will thus tend to procure a better class of man. Secondly, make the preliminary examination more stringent. When he (Mr. Raymond) entered, and probably the same obtained now, it was a mere farce. Some of the more advanced of the professors are in favour of this measure, and recently Professor MacFadyean pointed out that the Council should have remedied this before. Thirdly, make the curriculum longer, say four years, as in France and elsewhere. Fourthly, make the practical examination very stringent, and include equitation up to riding a quiet horse over a hurdle. These measures should come into force, say, five or seven years hence, so that no one may suffer by the innovation. Mr. Raymond, continuing, said it seemed to him that all these items were perfectly fair, and if adopted would help to prevent overcrowding, at the same time raise the standard of the profession to a higher level. The fourth resolution, which he objected to, was really a plausible dodge to make things more difficult at the examination tables, and thus to check the flow of men into the profession. He was convinced that we should have to come to the measures he had suggested sooner or later, and the sooner our minds were made up the better for all concerned. In conclusion, Mr. Raymond proposed, "That the fourth resolution of the Committee's Report be referred to the Committee for revision." In reply to the Chairman, Mr. Raymond said he approved of all the resolutions of the Committee except the fourth. He wished to emphasise this, as it had been reported in the professional journals that he was adverse to the adoption of written examinations, whereas he personally thought such an innovation would be most beneficial.

Mr. WRIGHT seconded Mr. Raymond's proposition, fully agreeing with the remarks that gentleman had made, except that instead of an examination in equitation, he would have one in practical dispensing.

Professor PRITCHARD considered that instead of submitting the Report to the Royal College of Veterinary Surgeons, it should be presented to the principals of the schools, as it had solely to do with the education of the students.

Mr. ROWE anticipated that if it were sent to the Royal Veterinary College it would be simply laid on one side; he felt that it had been altogether a waste of time by the Committee, and he was not sorry that he had not personally taken a more active part.

Mr. HURNDALL said the Committee had some little confidence that their report would be courteously received, but he considered it should be presented to the Council of the Royal College of Veterinary Surgeons; if the Council, which was the head of the profession, gave an opinion on the subjects the schools would follow in its wake. He was certainly not disposed to allow Mr. Raymond's motion to pass unchallenged, and to save time he proposed as an amendment, "That the Report be adopted as it stands."

Mr. ROWE was more inclined to support the Report as read than to support Mr. Raymond's views. To double the fees was to rob the parents of the students, but he could not cordially second the adoption of the Report, because he objected to its first clause. He considered the standard of education at present demanded from young men entering on their professional studies quite sufficient, and he would move, as a further amendment, "That clause 1 of the Report be expunged."

Mr. HURNDALL considered the first clause of quite as much importance as any other, and he could not personally accept Mr. Rowe's amendment, for he wanted to see men entering the colleges who had made good use of their time at school; such men were well prepared to take in the subjects they would have to study, and such would also be able to take a more prominent position in society.

Mr. WRIGHT asked Mr. Hurndall if he wished the Matriculation Examination to be on a par with that of the medical schools. Mr. Hurndall replied that it was very desirable that they should be more alike than at present.

Mr. ROGERS cordially seconded Mr. Hurndall's resolution that the Report be adopted as it stood. Mr. Rowe's amendment was not seconded, and the original amendment was carried.

Mr. HURNDALL considered that the Report should be preceded by a summary of the course the Society had adopted from the commencement in this matter.

Mr. RAYMOND suggested it should be referred to the Committee to consider what should be done with the Report.

Professor PRITCHARD again expressed his opinion that it should be sent to the principals of the schools.

The HONORARY SECRETARY thought there would be a difficulty in getting another Committee meeting as was suggested, for its members had already given a great deal of time, and had thoroughly considered the Report, and he begged to move, "That the resolutions as suggested by the Committee and approved at that meeting be presented to the President and Council of the Royal College of Veterinary Surgeons."

Mr. WRAGG said that was no doubt the intention of the Society when it appointed the Committee, and of the Committee when it considered the subject.

Mr. HURNDALL seconded the Secretary's proposition, which was carried.

The CHAIRMAN suggested the Report should take the form of a memorial, which was agreed to.

Mr. RAYMOND thought the whole of the supporters of the resolutions should form a deputation to present the Report, but subsequently proposed, "That the mover and seconder of the resolution, together with the President of the Society, should draw up the memorial and present it to the Council." This was agreed to.

A vote of thanks was accorded the Chairman.

SIDNEY VILLAR, *Hon. Sec.*

A NEW VETERINARY SOCIETY.

A MEETING was held on July 5th, at the North-eastern Ho'el, Darlington, when it was decided to form a new Association, to be named the South Durham and North Yorkshire Veterinary Medical Association, the meetings of which are to be held quarterly, and the annual subscription be 10s. 6d.

Seventeen members were enrolled, and the following officers were elected, viz.—

President . .	Mr. J. Nettelton, Northallerton.
Vice-Presidents	Mr. G. T. Pickering, York. Mr. J. G. Deans, Bishop Auckland.
Treasurer . .	Mr. F. R. Stevens, Darlington.
Secretary . .	Mr. W. Awde, Stockton-on-Tees.
Auditors . .	Mr. G. E. Nash, Richmond. Mr. H. Gelsthorpe, Darlington.

Messrs. Stevens, Gelsthorpe, Briggs, Nash, and the Secretary were appointed a committee to draw up the Rules.

It is expected that the first regular meeting will be held in the first week of September, when the President will deliver his inaugural address, etc.

ROYAL SOCIETY FOR THE PREVENTION OF CRUELTY TO ANIMALS.

THE sixty-fifth anniversary of this Society took place on June 27th, the first meeting being held in the forenoon, the President, Lord Aberdare, in the chair. After the Annual Report had been read, and the first resolution passed, Dr. FLEMING, Principal Veterinary Surgeon of the Army, proposed the second resolution. He said, I have very great pleasure in moving the resolution put into my hands, which refers to the presentation of a gold medal to Professor Walley. It affords me much gratification to be associated with this motion, because Professor Walley has been the head and front of the scientific agitation in his own country, as well as in England and Ireland, against the barbarous practice of dishorning. For a great number of years he has laboured in law courts, at meetings, and in the press, and assisted this Society materially in gaining a great achievement, which has been alluded to to-day by the speakers who have preceded me, and described in our Report at great length. I am the better able to say this knowing the work Professor Walley has done, and representing to some extent the profession to which he belongs. Undoubtedly, the judges' decision is one of the greatest and most far-reaching victories we have ever obtained; for their judgments will be, I hope, of great use, and serve as a precedent to the action of the Society in other forms of cruelty, which might be termed "fashionable cruelties." Some ten or twelve years ago, at a meeting of the National Veterinary Congress of this country over which I had the honour to preside, many cruel practices were discussed and condemned. Among these was the custom of dishorning cattle, and I can assure you that that meeting was unanimous as to the abominable cruelty attending the practice. I therefore think the acknowledgment of Professor Walley's services which you propose to make to-day (and in this I am sure the Professor would agree with me) should be regarded as a compliment paid to the whole veterinary profession, which I may claim has been a good friend to the Society and to its cause, the protection of animals. Veterinarians understand better than the ordinary public what pain is to dumb animals, and it is their mission to reduce it to the lowest limits—in fact, their work is one long endeavour to assist the Society in its most sacred objects. As I have already mentioned, I hope the opinion of the judges will form a great precedent for future work by the

Society, which must not relax its crusade against all cruelty. There are other forms of cruelty, at present backed up by a certain section of public opinion, but these, though not so glaring as dishorning, have to be suppressed. The docking of horses was alluded to by Mr. Justice Hawkins in a remarkable way. I am enabled, owing to my position in the Army, to see the great evils of this custom. We often have to buy horses so mutilated. Army horses suffer terribly from this disfigurement. They have to stand out in the open for many hours during the hot weather, and the torture they experience from flies is very severe. Thus you see there is not only the actual pain at the time of mutilation, and for a long time after, but the operation deprives the animals of their most important defence against insects. I beg to lay this good resolution before you:—

"That the gold medal of this Society be presented by her Grace the Duchess of Westminster, at the meeting to be held at St. James's Hall this afternoon, to Professor Walley, in recognition of the great services he has rendered to the cause of the Society, and notably by his able and persistent opposition to the practice of dishorning cattle."

I am sure my friend Professor Walley will receive this acknowledgment with the greatest pleasure he has ever experienced.

Mr. F. D. MOCATTA: I wish it had fallen to some one with more power than myself to give expression to the value of this resolution. It is quite true that we owe much to the veterinary profession, and it is also true, although Dr. Fleming would not tell you so, that we owe a great debt of gratitude to himself personally, to Professor Pritchard and others, for the immense assistance they have rendered and are always happy to render us. Although we are guided by our excellent Secretary, who makes our objects the study of his life, yet without the help of the veterinary profession our judgments would want force before magistrates. There is no doubt veterinary surgeons have been our mainstay, and their support invaluable to us from the first. We have often been accused of pressing hard on poor people, depending for their livelihood perhaps on the labour of a single animal, while ladies and gentlemen of high position escape scot free. This I may say at once is a groundless charge, for it is one of the great glories of this Society, which can be proved beyond question, that we are not respecters of persons, that we endeavour to use influence with our Government for the purpose of making salutary and impartial laws for the benefit of dumb animals, and in counteracting cruel practices which have nothing to recommend them but the base idea of making a little additional gain. In regard to this latter point, as has been already explained to you with great ability, our veterinary friends have stood us in good stead; and if any one living deserves the gold medal it is the gentleman who has laboured so hard and persistently, side by side with us, to eradicate the barbarous custom of dishorning cattle. Unfortunately a large amount of cruelty still prevails in our midst, despite the officers of the Society. I do not mean to decry them. Their duties are arduous enough, for there is hardly a market, or fair, or street, or stable but which is under the eyes of this institution. The value of this surveillance cannot be measured simply by the number of offenders actually punished. Cruelly disposed people know that they are being watched, and this tends obviously to the benefit of the animals under their charge. I think most persons who have to be out late at nights during the season must have noted the marked improvement in the condition of the night cab horses. The animals now to be seen at such work compare very favourably with those horribly disfigured creatures, only to be urged on by the frequent use of the whip, which we recollect in the days of our youth, to our lasting disgrace. As a great traveller, especially through Europe, I have noticed the superiority of England over every other country as regards the question of humanity. I am proud

of this, but I should like to see other nations making greater strides in the same direction. Still, we have much to be thankful for, this Society having exercised a most beneficent influence in the countries around us. In Germany the cause is spreading rapidly, I believe, while in France it is improving, and even in Spain it is beginning to be felt. I do not think we can say much about Russia, though our Secretary says there are two societies in that country. In Norway and Sweden the movement exists, and is likely to advance. Thus there is a marked improvement all over Europe. We must not forget that foreign societies are not favoured in the same manner as ours are here; but there is a gradually growing public opinion abroad on this subject which must tend to support our objects. In America they have made great headway—in fact, they are on a par with ourselves, and from what I can understand a laudable competition exists between the two branches of the Anglo-Saxon race. People who are old enough to remember this Society from the beginning must have noticed what a remarkable change has taken place since then in the treatment of animals, and I doubt not those who live fifty years hence will be not less surprised at the benighted condition of their ancestors of to-day. I have much pleasure in seconding the motion.

The PRESIDENT: I dare say you would like to know something of the history of this gold medal. Some years ago Her Majesty the Queen suggested that the Society should institute a gold medal, in order to bestow it on the most conspicuous workers in our cause. We did not undertake, as is sometimes done, to award one of these every year, because it often happens under these circumstances that you have to look out for a man on whom to confer the distinction, but we hold it in our hands to give it when well deserved. Our Patron is the Queen, and the medal, before it was issued, was submitted to Her Majesty, who was graciously pleased to examine it, and remarked that although it contained the figures of a good number of animals, yet the cat was not included, an animal which was the subject of a great deal of active and thoughtless cruelty. Another suggestion which fell from Her Majesty was that the first medal ought to be bestowed on Mr. Colam, who had laboured so hard in the interests of the Society. Since then there have only been two other medals awarded, and these were in acknowledgment of invaluable services rendered to us by very eminent men in the veterinary profession, namely, Dr. Fleming and Professor Pritchard. This, therefore, is only the fourth medal that has been issued by the Society.

The resolution was carried unanimously.

At the second meeting, held in the afternoon, the Duchess of Westminster distributed the general prizes awarded by the Society. Previous to this the noble PRESIDENT said, Before proceeding as usual, there is a special ceremony of an interesting character to be performed. At our meeting this morning we came to the resolution to ask the Duchess of Westminster to be kind enough to present the gold medal awarded by the Society to Professor Walley, for the eminent services he has rendered our cause over a long series of years, and especially during a recent important trial. Some years ago the Society decided to institute a gold medal, which was only intended for presentation to those who had performed distinguished services in aid of our objects. These medals are not granted as a matter of course every year; indeed, the present medal is only the fourth that has been issued. The first was presented to our Secretary, Mr. Colam, on the suggestion of Her Majesty the Queen, and the others have been won by eminent members of the veterinary profession, without whose assistance it would have been absolutely impossible for the Society to have achieved what it has. The second medal was conferred on Dr. Fleming, the next on Professor Pritchard, and now we propose to bestow

the fourth on Professor Walley in accordance with the resolution I have referred to.

Her Grace the Duchess of Westminster having presented the medal—

Professor WALLEY said, When I received from Mr. Colam, a few days ago, a note intimating that it was the desire of the executive of the Royal Society for the Prevention of Cruelty to Animals to confer on me the distinction of a gold medal, I felt very much astonished, and not a little gratified. I was not aware at the time that any such recognition was ever given to any person in this country for services rendered in connection with cruelty to animals. At the same time, I candidly confess I looked upon it as a very great honour, and I do so now more than ever, when I find that only three persons have preceded me as recipients of this rare distinction. I can only thank the members of the Society very heartily for their handsome acknowledgment of services which I look upon as no more than a duty incumbent on me. Those who are placed in high positions, and who have opportunities of seeing what cruelty to animals means, ought to do their best to mitigate the sufferings of their dumb fellow creatures. Special knowledge involves, or should do so, special duties on every individual. I hold that it is the duty of the veterinary profession to come forward and assist in putting down anything like cruelty to animals. I accept this honour, your Grace, as a token that this Society regards the veterinary profession with esteem, and I receive it far more on its behalf than as an acknowledgment of any special merit of my own. I note in your Report with pleasure that one of the great objects of the Society is to prevent cruelty by teaching. I have always held that you can do more by teaching persons what is cruelty than by prosecution. In connection with this matter of dishorning, my object has been to educate people to do away with such a cruel practice. In a large portion of Scotland the efforts of this Society, and of kindred societies, have been very successful; for whereas a year or two ago cattle would have had their horns cut off close to their heads, now they are only called upon to suffer to a limited extent by having the tips removed. I am sorry to see in the sister isle the practice is carried on to a large extent. However, I do not despair that our united efforts will in time lessen the evil, if they do not some day overcome it entirely.

Army Veterinary Department.

Gazette, July 5th.

ARTILLERY VOLUNTEERS, 2ND WEST RIDING OF YORKSHIRE.—Parlane Walker, gentleman, to be Veterinary Surgeon.

Gazette, July 12th.

DITTO, FIRST WORCESTER.—Henry Margetts Stanley, gentleman, to be Veterinary Surgeon.

Veterinary Surgeon Finlayson has embarked for a tour of service in Egypt, *vice* T. A. Mitchell, who is invalided from that country to England.

Obituary.

THE following deaths have been reported:—

T. W. Jordan, M.R.C.V.S., Tenterden, Kent,	graduated in	...	1873
F. W. Plumbly, North Walsingham	,,	...	1870
G. Philp, St. Andrews, Fife	,,	...	1872-1880

Notes and News.

MAD DOGS IN LONDON.—The Chief Commissioner of the Metropolitan Police, in his monthly report to the Home Secretary with regard to the seizure of stray or ferocious dogs during last June, reports that no fewer than 1,530 dogs for whom no owners could be found were seized and sent to the Dogs' Home at Battersea; 55 dogs were killed in the streets—36 by the police, and 19 by private persons. An examination of these by veterinary surgeons showed that 18 suffered from rabies, 13 from epilepsy, 3 from convulsions, 1 from gastritic fits, 6 disease not discovered, 1 not examined, 3 ferocious or mad; whilst 1 dog died from rabies at the Dogs' Home. No fewer than 144 persons were bitten by dogs during the month.

DESTRUCTION BY WILD ANIMALS.—The deaths by snake-bites in the North-west Provinces of India last year were 6,000. In Madras 10,096 cattle were killed by wild animals, and the loss of human life by snakes and wild animals was 1,642.

AN UNUSUAL INSTANCE OF LONGEVITY IN THE HORSE.—The following instance of protracted longevity is given by the *Echo Vétérinaire*. After the long war with France in the early part of this century, a certain number of thoroughbred English horses were sent to the Hanoverian cavalry, and among these was one which had served in the 3rd Regiment of Dragoons since 1793. This horse had gone through the campaign in Spain and Portugal during seven years, and was present at the battle of Waterloo in 1815. In 1816 it was transferred to the Hussars of the Guard, in which regiment it remained until 1847, when it was made a pensioner. At the battle of Gracien-Homandez, Spain, it was ridden by Colonel Von Arentschild. It died in 1850, when more than sixty years old, and it had never been wounded, notwithstanding the many battles in which it had played a part.

HORSE-FLESH CONSUMPTION IN PARIS.—The enormous quantity of 120,037,618 pounds of horse-flesh was consumed as human food in Paris between July 6th, 1866, and January 1st, 1889. Our authority for this is M. Decroix, in the *Revue des Sciences Naturelles Appliquées*. He gets his information from the returns that have been regularly published by the administration. But we are wrong in calling it horse-flesh, for the 266,312 horses in the returns did not make up the full quantity of flesh mentioned; it includes also the carcasses of 8,971 asses and 677 mules.

THE ORIGIN OF DOMESTIC ANIMALS.—In studying zoological distribution the range of the domestic animals is not to be taken into consideration, for man has been so long engaged in scattering them over the world that it is now impossible to trace their original homes. Indeed, any attempt to assign them to wild progenitors must to a large extent be simply guess-work. The tame cattle of our farmyards and fields may perhaps be sprung from the Urus and other wild oxen which at one time roamed through the vast forests of Europe, and the sty-living pig from the fierce swine which still hold their own in many parts of the Continent and in the thickets of northern Africa. In like manner, the cat is supposed to be descended from a Persian ancestor, and the various dogs of different barbarous tribes can with some confidence be considered merely the tamed wolves, foxes, or jackals of the regions which they inhabit. The ass is evidently a civilised form of the wild ass of Abyssinia, *Asinus tæniopus*, but it is doubtful whether we have yet made any progress in the search after the progenitors of the horse and the camel. No doubt, a so-called wild horse has been found in Central Asia, and wild camels are not infrequent in the same region. But whether these animals

are not tame species which have escaped from domestication long ago and re-established their freedom is a question to which a favourable answer might quite as readily be given as to the contrary thesis. The turkey, it is certain, came from America, the peacock is an Indian bird, and the guinea-fowl was originally from Africa. The domestic goose is regarded as descended from the greylog, or common wild goose, though all the species are capable of domestication; while the duck in our ponds is, in its wild state, known as the mallard. But the domestic fowl has been so long the servant of man that it is now mere speculation to assign to its progenitor any exact home, the Bankiva fowl of Java and other islands of Malaysia having no better claim to this distinction than the jungle fowl of India, which for a time was proclaimed as the barbarous ancestor of the farm-yard hen. Much the same remarks may be made regarding the honey bee, the silkworm, and the Mexican cochineal; for though they have all been traced to wild forms, they have been kept so long under the control of man that their exact origin is either lost or at best doubtful.—*Our Earth and its Story.*

ANTIRABIC INOCULATIONS.—Within the last few years M. Galtier, of the Lyons Veterinary School, has shown by his experiments on herbivorous animals that, even after they have been bitten a certain time, they may be rendered refractory to Rabies by venous injections of rabid virus. MM. Nocard and Roux have also employed this method. It may be applied to all ruminating animals and to pigs; it has the merit of being simple and easy. The virus may be obtained from the animal which has inflicted the bite. The nerve-substance is dissolved in water, and filtered in order to eliminate the solid particles. M. Galtier has made several successful inoculations this year. In February he vaccinated two ewes. They were submitted to four venous injections. They were rendered completely refractory, and in July were sent to the slaughter-house. Further successful experiments have confirmed M. Galtier's belief that herbivorous and omnivorous animals may be rendered completely refractory to Rabies by this method of inoculation. He considers that the animals not only escape the consequence of the immediate bite, but also enjoy immunity in the future.

Correspondence.

CLEVER CRITICISM.

SIR,—The Editor of *The Journal of Comparative Pathology and Therapeutics*, in his article on "Influenza of the Horse," says:—

"If any further illustration were required of the present chaotic state of our knowledge regarding some of the most serious diseases of the horse, it would be found in the report of the Veterinary Department of the Army. By referring to this Report for 1888, it will be seen that the seven zymotic diseases of the horse recognised are—Glanders, Farcy, Horse-pox, Strangles, Influenza, Rabies, and Epizootic Fever. What the last of these diseases is must, presumably, be well known to the members of the Army Veterinary Department, for it is under these headings that the returns of sickness are made by all regimental veterinary surgeons; and yet it would be safe to say that nobody outside of the Army Veterinary Department can form any clear idea as to what disease is here referred to. Confusion is made still worse when it is observed that in this same report, under the heading of general diseases, we find ranged along with such affections as cancer, rheumatism, and melanosis, five forms of fever, viz., Simple, Traumatic, Catarrhal, Bilious,

and Anthrax. And further, among diseases of the respiratory apparatus there are classed Pneumonia and Pleuro-Pneumonia. To unravel the system of nosology here employed, or to connect it with any other, would, I think, pass the wit of man."

But the captious writer of the above paragraph does not suggest any better nosology than the one he tries to condemn; while in the same journal he omits all mention of fevers fully described in a work he has reviewed, because it was also by an army veterinary surgeon. And readers of the VETERINARY JOURNAL are already acquainted with the excellent work by Mr. Nunn, A.V.D., on the "South African Horse Sickness," a disease he has shown to be due to the growth and action of special micro-organisms. (See his reports in the VETERINARY JOURNAL, 1888-9.)

And now I may venture to explain the classification of disease adopted in the Army Veterinary Department. It is that sent in by army veterinary surgeons throughout the service. The Principal Veterinary Surgeon collects and totals them together, as he was not present to watch the cases, and therefore cannot invent names for cases he has not actually witnessed. In this the veterinary surgeon is entirely responsible; and if his nomenclature is such as calls for comment from hasty critics, the Principal Veterinary Surgeon may rightly inquire, "Whence the source of the primary weakness of nosology?" If he consults the young officers under him, and who apply for admission annually into the department, he finds that they adopt the nomenclature of their teachers.

It is clear, then, that veterinary nosology is in a very unsatisfactory state, and the source of it is not to be placed at the door of the Army Veterinary Department, but may be found a step nearer home. "Nothing worse in its way can be imagined," we are told, "than the term Epizootic Fever, and Catarrhal and Bilious Fever are but little better." Yet these are the terms which are taught in colleges to-day!

Then the writer tells us that "the nosology of human diseases, compared with veterinary systems of classification, is well-nigh *perfect*." How, then, does he account for such names as Typhus and Typhoid, Ague, Malarial Fever, Gout, and a host of similar designations which decorate the pages of modern medical literature? Or is the recent Scarlatina discussion to be regarded as a type of "perfect" medical nosology, in the language of our critic?

But not to go far, what was the nomenclature of the colleges, and the Dick Veterinary College in particular, with regard to the disease called "Roaring" in horses, until the chief of the Army Veterinary Department suggested a designation (and probably an effectual cure for the disease), which is now that of the profession?

Further on, the editor says: "Nothing but confusion can be expected to reign as long as diseases regarded as distinct are spoken of as types or forms of Influenza." And where has this critic borrowed his remark from, but from an army veterinary surgeon's article he has reviewed in the same journal? We quote the passage alluded to: "We are of opinion that a careful study of the disease called Influenza in the horse would lead to its being divided into three or more distinct affections. Further, we think that the distinctive characters of different forms of fever in the horse are such as in practice could not allow them to be confounded any longer—an opinion which all subsequent observation must tend to confirm. . . . . The practical value of studying the several varieties of Influenza, so far as they help the classification of fevers, has been to a great extent recognised, but no systematic measures have been taken to separate a long list of fevers, which are described promiscuously along with the ordinary 'Influenza.' Considering the importance of these fevers, *e.g.*, intermittent, remittent, and a

host of others, the subject is worthy, I think, of being specially investigated."

One is disposed to think, after all is considered, that the young "editor" would do better could he display a little less virulency.

In conclusion, I have no hesitation in saying that anyone with any respect for his profession would never write thus of his brother professionals.

"A DICK VETERINARY STUDENT."

FLIES AS BEARERS OF CONTAGIA.

DEAR SIR,—I am of opinion that there are many people who do not place enough importance upon the fact that *flies* are the frequent means of communicating contagious diseases from one animal to another. Take Farcy and Glanders, for instance, and note how reasonable it is to suppose that a fly or flies may alight upon a farcy ulcer or "button," and then carry the poison on to a raw sore on the body of a neighbouring animal. "SNAFFLE BRIDLE."

STRANGE NOTIONS.

SIR,—A so-called "Public Meeting" was held at St. James's Hall, London, on July 6th, "to protest against all attempts to create a panic with a view to inducing Parliament to sanction legislation enforcing the muzzling of healthy and inoffensive dogs throughout the United Kingdom, as a means of stamping out rabies."

The Bishop of Ely occupied the chair, and among the speakers there was not one qualified to speak on the subject from a professional point of view, except Professor Woodroffe Hill, F.R.C.V.S., who is reported to have said: "Pasteur is a quack, and a bigger humbug never lived. In a few years he will fall to the ground. Let him stop his experiments at his brewers' grain fermentations, and let us and our dogs alone."

He proposed "That the experience of foreign countries having demonstrated that general compulsory muzzling has not succeeded in preventing the recurrence of rabies epidemics, this meeting is of opinion that the attention of Parliament should be directed rather to the best mode of bringing home a sense of the responsibilities to owners and keepers of dogs, such, for example, as registration, than to needless and vexatious interference with healthy dogs." He was confident that rabies was a most rare disease; that it occurred spontaneously at times; and therefore muzzling was a totally unfit way to stamp it out.

It is earnestly to be hoped that, if correctly reported, the public will not accept Mr. Hill as in any way representing the veterinary profession in this matter. As for the disgraceful denunciation of Pasteur, we have reason to be sorry and ashamed that any among our number should express himself in such a manner, and bring upon us the ridicule of scientific and intelligent men. Airing such strange and erroneous notions as the above, not only damages the person who holds them, but casts a shade over the profession.

F.R.C.V.S.

July 10th.

PROTECTIVE INOCULATION.

DEAR SIR,—Many of us, methinks, have gone "inoculation crazy." It seems that men and the lower animals will soon be vaccinated or inoculated with the bacteria of all contagious diseases under the sun, Syphilis included. Healthy and vigorous children may soon be converted into cesspools of diseases.

Sir James Paget's words are worth calling to mind: "The progress of the vaccine or variolus infection of the blood shows us that a *permanent morbid condition* of that fluid is established by the action of these specific poisons on it; and although this condition may, so far at least as it protects the individual from any further attack of the same disease, be regarded as exercising a beneficial influence upon the economy, yet it is not the less to be looked upon *as a morbid state.*

"In forming an estimate of the persistent changes produced in the blood by this and similar infectious diseases, we must not lose sight of the influence *which the tissues themselves altered by the inoculation*, exercise upon the blood; they will necessarily react upon it, so as to assist materially in preserving a permanent morbid (though beneficial) condition."—*Lectures on Inflammation*, 1863.

A brother of mine many years ago was vaccinated from a diseased child, and the result was that he was very unwell, and his submaxillary glands were, and have been ever since, enlarged and much affected. Hereditary Syphilis may be latent in a child for months, and even years, and, notwithstanding, may infect other children if their vaccine is taken from it.

Herbert Spencer, speaking of the deplorable and increasing ill-health of the rising generation, thus expresses himself: "We are not certain that the propagation of subdued forms of constitutional disease, through the agency of vaccination, is not a part cause. Sundry facts in pathology suggest the inference that when the system of a vaccinated child is excreting the vaccine virus by means of pustules it will tend also to excrete, through such pustules, other morbific matters, especially if these morbific matters are of a kind ordinarily got rid of by the skin, as are some of the worst of them. Hence it is very possible—probable even—that a child with a constitutional taint too slight to show itself in visible disease may through the medium of vitiated vaccine lymph taken from it convey a like constitutional taint to other children, and these to others."

Then as to M. Pasteur's inoculation for Hydrophobia, it seems to me that *it induces no disease, general or local.* Is it not a fact that the Prussian Government prevented the further inoculation of sheep with Anthrax virus?—I am yours faithfully,

"NATURE."

Communications, Books, Journals, etc., Received.

COMMUNICATIONS have been received from F. Duck, A.V.D., Woolwich; "F.R.C.V.S.;" "Snaffle Bridle;" J. A. Nunn, A.V.D., Barrackpore, India; J. J. Meredith, A.V.D., Dhow, India; "A Dick Veterinary Student;" W. Awde, Stockton-on-Tees; R. W. B.; A. W. Hill, London; "Nature;" S. Villar, Harrow.

BOOKS AND PAMPHLETS: *G. and A. Gresswell*, The Diseases and Disorders of the Ox; *E. Dele*, Expertise Obligatoire des Viandes; Annual Report of the Agricultural Department; Bulletin des Séances de la Société Nationale d'Agriculture de France; *M. Reuter*, Die Staupe der Hunde; *N. Thionot*, Précis de Microbie Medicale et Vétérinaire.

JOURNALS, ETC.: *Annales de Méd. Vétérinaire; Der Thierarzt; Recueil de Méd. Vétérinaire; Wochenschrift für Thierheilkunde und Viehzucht; Revue Vétérinaire; Der Hufschmied; American Live Stock Journal; Lancet; American Veterinary Review; British Medical Journal; L'Echo Vétérinaire; Archiv fur Wissenschaftliche und Praktische Thierheilkunde; Deutsche Zeitschrift für Thiermedicin und Vergleichende Pathologie; Edinburgh Medical Journal; Live Stock Journal; Mark Lane Express; Repertorium der Thierheilkunde; Journal de Med. Vétérinaire.*

NEWSPAPERS: *Spalding Free Press; Queenslander; New York Herald; South-Eastern Counties Gazette; Scotsman.*